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Market-driven development and poverty reduction: A value chain analysis of fresh vegetables in Kenya and Tanzania

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Ministry of Agriculture, Kenya

Project Team:

Thomas Koenig (Team Leader), Jantje Blatt, Kristian Brakel, Kristina Kloss, Thorsten Nilges, Franziska Woellert

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SLE

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The findings, interpretations, and conclusions in this report are those of the authors. They do not necessarily represent the views of the German Federal Ministry for Economic Cooperation and Development (BMZ) or the German Technical Cooperation (GTZ).

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	Sitz:	Hessische Straße 1-2 10115 Berlin, Germany
	E-Mail:	sabine.doerr@agrar.hu-berlin.de
	Internet:	www.agrar.hu-berlin.de/sle www.berlinerseminar.de
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Foreword

The Centre for Advanced Training in Rural Development (Seminar für Ländliche Entwicklung), at the Humboldt University Berlin, has trained young professionals in the field of German and international development cooperation for more than forty years.

Three month consulting projects conducted on behalf of German and international cooperation organisations form part of the one-year postgraduate course. In multidisciplinary teams young professionals carry out research on innovative future-oriented topics, and act as consultants. Involving various local actors in the process is of paramount importance here. The findings of this “applied research” provide an immediate contribution to solving development problems in rural areas.

Over the years, SLE has managed more than a hundred consulting projects in more than sixty countries, and regularly publishes the results in this series.

In 2007 four groups from the 45th course of the SLE simultaneously executed projects in Burkina Faso, Kenya and Tanzania, Mozambique and Philippines which focussed on the planning and poverty-orientation of development programmes.

The present study was sponsored by the German Technical Cooperation (GTZ) and the German Federal Ministry for Economic Development and Cooperation (BMZ).

Prof. Otto Kaufmann
Dean
Agricultural Horticultural Faculty
Humboldt University Berlin

Carola Jacobi-Sambou
Director
SLE – Centre for Advanced
Training in Rural Development

Acknowledgements

Preliminary Note

On 27 December 2007 the presidential election was held in Kenya. Immediately following the election large-scale riots took place to protest against the delay in the vote count and against the election result itself. Since then there have been violent clashes along political and ethnic lines in the course of which almost 800 people have lost their lives.

The study team is appalled by these events. We were in Nairobi and the neighbouring regions in Kenya during the election campaign and we spent a very peaceful time there. During the months spent in Kenya the SLE group had no inkling that the situation would escalate to such an extent. On a day to day basis we did not experience Kenyan tribal allegiances as a universally determining factor. Our partners and the people we interviewed for the study cooperated beyond ethnic lines.

Our thoughts go out to these people who were so helpful and open to us during our stay. The thought that the lives of some of our partners are endangered by the riots and that others might be the victims of violence is very distressing for us.

We truly hope that peace will soon return to Kenya and – with the support of the donor community – that reforms take place that will really help the poorest Kenyans.

First of all, the study team would like to thank GTZ-BEAF, represented by Michael Bosch, for the commission to carry out the present study. Dr. Dagmar Mithöfer, icipe, and Stefan Pletziger, AVRDC; acted as the representatives of our partner institutions in Kenya and Tanzania. We are very thankful for their support with logistics and organisation as well as their brilliant expertise. Hassan Mndiga, AVRDC, was a very important key resource person who provided a great deal of important input for the study. In Kenya we cooperated closely with GTZ-PSDA, represented by Eberhard Krain, Margaret Orina and Heike Höffler. Monica Mueni and Virginia Mwai, both Ministry of Agriculture in Kenya, were very supportive during the data collection in Kenya. All of them helped the team to establish contacts to interview partners and provided detailed information on the Kenyan situation.

Our cooperation with the translators was fruitful and effective in carrying out the interviews at all levels as we intended. We would like to thank Gladys Machange, David Solomon, Mayson Ruangisa, Peter Karanka and Francis Imani in Tanzania and Teresiah Mbugua and Gibson Githaiga in Kenya for their excellent cooperation.

During our data collection the team split up into subgroups at different production sites and markets to carry out interviews. We appreciated the collaboration with our

counterparts in assisting us in contacting all the interview partners and receiving detailed information about the local situation. In Tanzania we cooperated with Simon Loto, Arumeru District, Mr. Maganga, Karatu District, and Fatuma Mdibalema, Arusha Municiplatiy Council. In Kenya Peter Ndungu, Farm Concern International, and Peter Makokha, MoA, both in Kieni West, Obadiah Mwangi in Mwea as well as Duncan Murithi, Farm Concern International and Monica Mueni, MoA, assisted us in Nairobi. For the issue of cross-border trade we would like to thank Josphat Mugambi, Kenyan trader, in particular for his open minded cooperation.

We talked to more than one hundred interview partners in both countries. This study would not have been possible without their willingness to spend so much time with us.

The SLE team, namely Iris Paulus and Gabi Beckmann provided valuable comments on our work at different stages. Nicholena Gann proofread the study to check the English language and Dorian Frieden finalised the layout.

We would like to express our thanks to everybody mentioned here for their particular support and contribution to this study.

The SLE-Team

Executive Summary

In recent years horticulture's relevance has increased in East Africa. Mainly export oriented middle and large scale enterprises have benefited from this development. At the same time, domestic demand for horticultural products has increased due to a rapidly growing urban population and relatively high income elasticity linked to demand for vegetables. Agriculture in general plays an important role in both countries' economies as the share of the Kenyan and Tanzanian GDP indicates (24% in Kenya und 45% in Tanzania).

Strengthening the labour intensive horticulture sub-sector could contribute to poverty reduction, because the majority of the poor population lives and works in rural areas. This is one of the core hypotheses of the present study. Horticulture in this context includes the entire value chain from production up to consumption of vegetables. Tomatoes and onions were chosen as the focus products of the study, because both commodities play an important role in the domestic vegetables market and, furthermore, the two research institutes icipe and AVRDC, with whom the study team cooperated, are particularly interested in these crops.

The following three major research areas were identified:

- Investigation into the potential for poverty reduction within a market-driven development of the respective value chains,
- Analyses of the cross-border onion trade between Tanzania und Kenya,
- Value chain comparison of the two countries.

First of all, in order to carry out the survey the poor actors of the value chains were identified, secondly their relation and power distribution among the actors was analysed and thirdly the legal regulations in force, the issue of standards in particular, were considered.

The analyses of fresh vegetables' value chains include the input supply, production, various stages of trading and marketing and finally consumption. Transport has been considered as a cross-sectional issue, because different actors provide this service at different stages within the chains. The regional cross-border trade of onions between Tanzania and Kenya is subsumed under domestic trade in statistical terms.

In addition to this functional perspective of value chains, there is an institutional perspective focusing on the actors' contribution to the chains. The study team combined this institutional perspective with the livelihood approach in order to determine the actors' living conditions and their vulnerability within the value chains. Qualitative and quantitative data were collected at production sites in the Arusha region, and the related market places in Arusha (Tanzania) and at markets in Nairobi

as well as in production areas in the north of Nairobi located in the Central Province of Kenya. The markets and production areas selected provided information to cover the issue of cross-border trade. The study team carried out the investigation from both ends of the value chain simultaneously.

Basically, both commodities are produced in two seasons. Hence, costs and profits are described separately according to one high supply and one low supply season. This seasonality causes both a high price fluctuation within one year and a different number of actors being involved in the chains accordingly. The brokers are an ideal example to illustrate this consequence. They normally do not purchase the commodities but they can connect business partners due to their knowledge of the markets. In high supply season, their service is very important for all actors but in low supply season supply and demand match up without any assistance. Furthermore, it is true to say that value chains are characterised by a huge number of business relations. There is not just ‚that one' marketing channel, but the consumer receives the produce via different channels. One rationale is the actors' different level of organisation. If producers have direct access to the wholesale market, fewer actors will be involved in the chain. In the case of tomatoes, brokers do not play that role because their information is not required. In contrast, transport services are in strong demand in the high supply season at an increased price.

The analysis of profit distribution in combination with livelihood data was used to determine who are the winners and who are the losers within the chains. The profit margins of the tomato chain in Kenya indicated that the producers gain the highest profit per kilogram during the low supply season. In the same season, the retailers earn less followed by the wholesalers. A different picture is presented if the volume traded is included in the calculation: the wholesalers gain most in both seasons, whereas it has to be said that in the low supply season the total amount of profit per unit to be distributed among all actors is much higher. The livelihood data confirm this finding. The majority of poor actors in the chains are the ‚porters', on the one hand those who carry onion bags or tomato crates by hand and on the other hand the handcart drivers who carry the commodities, for instance from the wholesale to the retail market stall. The qualitative interviews clearly demonstrated these findings. On a country by country comparison the situation is very similar. One major conclusion is that the farmers do not belong to the poorest actors in the chains, although mainly smallholders were considered. Those farmers, even smallholders, growing vegetables as cash crops are equipped with a set of beneficial factors compared to many other actors from the informal sector.

As far as market-driven development is concerned the study established that there is no political restriction on prices or volumes. Many of the actors in trade, marketing

and transport operate in the informal sector. Standards related to food or consistent measuring do exist but hardly any actor is aware of them. Hence, the study team could not prove the hypotheses that standards used in the export business of vegetables currently have a positive impact on the domestic market (trickle-down effect). In addition to that, general demand for tomatoes and onions is high in both countries, but a specific demand e. g. related to food quality issues plays a minor role as a driving force on the market. However, an exception might be the cross-border trade of onions from Tanzania to Kenya. Kenyan consumers in Nairobi and surrounding towns prefer Tanzanian onions because of better quality in terms of storability and visual appearance. Looking at the cross-border trade, clearing agents are additional actors in the value chain running a profitable business. The Kenyan onion producers compete seriously with Tanzanian onion suppliers, consequently a number of Kenyan farmers have to respond through greater diversification.

The recommendations for further research and possible implementation at the end of the study are based on bottlenecks and opportunities identified. For example, the issue of contract farming is seen to be very controversial. Farmers are rather sceptical of this binding relationship, while a number of NGO and state actors perceive contract farming as a chance to improve the farmers‘ situation particularly if smallholders are involved. Further investigation could help to clarify this issue. As a second example the study team established that several actor groups along the chain faced cash constraints. Very often a small amount of money is required which is difficult to borrow due to the limited access to the financial sector. This demand is met by various offers from microfinance institutions. This gap in the market can be closed through improved information flow.

Zusammenfassung

Der Gemüsesektor in Ostafrika hat in den vergangenen Jahren an Bedeutung gewonnen. Von der steigenden globalen Nachfrage profitieren mittlere und große exportorientierte Unternehmen. Gleichzeitig ist ein zunehmender Gemüseverbrauch auf den nationalen Märkten zu beobachten. Eine stark wachsende städtische Bevölkerung und ein positives Wirtschaftswachstum, das mit einer relativ hohen Einkommenselastizität der Nachfrage nach Gemüse verbunden ist, sorgten in den vergangenen Jahren für diese Entwicklung. Die Landwirtschaft spielt in Kenia und Tansania insgesamt volkswirtschaftlich eine ausgesprochen wichtige Rolle, wie ihr Anteil am jeweiligen Bruttosozialprodukt beider Ländern zeigt (24% in Kenia und 45% in Tansania).

Da die Mehrheit der armen Bevölkerung im ländlichen Raum lebt und arbeitet, kann von einer Stärkung des arbeitsintensiven Gemüsesektors ein Beitrag zur Armutsreduzierung erwartet werden. So lautet eine zentrale These der hier vorliegenden Studie. Unter Gemüsesektor wird in diesem Zusammenhang nicht nur die Primärproduktion verstanden, sondern die gesamte Wertschöpfungskette von der Produktion bis zum Konsum. Tomaten und Zwiebeln wurden als Untersuchungsprodukte ausgewählt, weil sie für die nationalen Märkte einschließlich des regionalen Handels eine wesentliche Rolle spielen. Gleichzeitig haben die beiden Forschungsinstitute icipe und AVRDC, mit denen das Projektteam eng zusammengearbeitet hat, ein besonderes Interesse an diesen Produkten.

Folgende drei Untersuchungsschwerpunkte wurden für die Studie formuliert:

- Untersuchung des Potentials zur Armutsbekämpfung und der Bedingungen einer marktgesteuerten Entwicklung bezüglich der betrachteten Wertschöpfungsketten,
- Analyse des grenzüberschreitenden Handels von Zwiebeln zwischen Tansania und Kenia,
- Darstellung der Wertschöpfungsketten im Ländervergleich.

Zur Bearbeitung dieser Schwerpunkte sind die armen Akteure der Wertschöpfungsketten identifiziert, das Verhältnis und die Machtverteilung unter den Akteuren betrachtet und die gesetzlichen Rahmenbedingungen insbesondere der Aspekt der relevanten Standards untersucht worden.

Die Analyse der Wertschöpfungsketten von unverarbeitetem Gemüse umfasst die Bereitstellung der Produktionsinputs, den Anbau selbst, die unterschiedlichen Vermarktungsstufen und den Konsum. Transport wird als Querschnittsthema betrachtet, weil er an mehreren Stellen der Ketten von unterschiedlichen Akteuren durchgeführt wird. Der regionale Zwiebelhandel von Tansania nach Kenia wird unter

statistischen Aspekten unter nationalem Handel subsumiert und hier gesondert betrachtet.

Zu dieser funktionalen Betrachtung der Wertschöpfungskette kommt noch die institutionelle Ebene hinzu, in der die Akteure den Kettengliedern unter der Frage zugeordnet werden, was sie zur Wertschöpfungskette beitragen. Die letztere, akteursorientierte Betrachtung ist in der Studie mit dem Livelihood-Ansatz kombiniert, um so mit zusätzlichen Angaben über den Lebensstandard und die Anfälligkeit der betrachteten Akteure einen deutlichen Armutsbezug in den Wertschöpfungsketten aufzuzeigen. Als Datengrundlage wurden quantitative und qualitative Erhebungen in Produktionsgebieten der Region Arusha sowie die wichtigsten Märkte in der Stadt Arusha (Tansania) und auf Märkten in Nairobi und zwei Produktionsgebiete nördlich der Hauptstadt in der Zentralprovinz (Kenia) erhoben. Diese Auswahl von Produktionsgebieten und Märkten war ebenfalls relevant für die Analyse des grenzüberschreitenden Zwiebelhandels von Tansania nach Kenia. Das Projektteam hat von beiden Enden der Wertschöpfungskette die Untersuchungen durchgeführt.

Das grundsätzliche Merkmal der beiden Gemüsearten, dass sie saisonal produziert werden, hat zur Folge, dass Kosten und Profite pro Produkt je nach Saison zu beschreiben sind: einmal für die Zeit hohen Angebotes und einmal für die Zeit niedrigen Angebotes. Diese saisonbedingte Angebotsschwankung bewirkt nicht nur eine große Preisvarianz zu unterschiedlichen Jahreszeiten sondern auch, dass je nach Angebotsmenge unterschiedlich viel Akteure an der Wertschöpfungskette beteiligt sind. Deutlich wird dies bei den ‚Brokern', die von ihrer Information über das Marktgeschehen profitieren. Sie erwerben i.d.R. das Produkt nicht können aber aufgrund ihres Informationsvorsprungs anderen Akteuren Geschäftsbeziehungen vermitteln. Bei hoher Angebotsmenge ist ihre Information sehr wichtig, bei niedrigem Angebot hingegen finden sich Anbieter und Nachfrager meistens ohne diese vermittelnde Dienstleistung. Weiterhin ist festzustellen, dass die Wertschöpfungsketten durch eine Vielzahl von Wirtschaftsbeziehungen gekennzeichnet sind. Es gibt nicht nur ‚den' einen Vermarktungsweg, sondern das Produkt gelangt unterschiedlich zum Endverbraucher/ zur Endverbraucherin. Dies ist u.a. in dem variierenden Organisationsgrad der Akteure begründet. Wenn Produzenten ihre Vermarktung gemeinsam organisieren oder einen direkten Zugang zum Großmarkt haben, sind weniger Akteure in die Kette involviert. Bei Tomaten fällt auf, dass in der Zeit niedrigen Angebotes wesentlich weniger Broker in der Kette auftreten, weil ihre Informationsdienstleistung nicht nachgefragt wird. Transport hingegen wird vor allem in der Zeit hohen Angebotes viel benötigt und ist dann entsprechend teuer.

Die Frage, wer innerhalb einer Wertschöpfungskette die Gewinner und die Verlierer sind, wurde mithilfe einer Profitverteilung in Kombination mit der Auswertung der Livelihood-Angaben ermittelt. Die Profitspannen bei Tomaten in Kenia beispielsweise ergaben, dass die Landwirte während des Niedrigangebotes die höchsten Gewinne pro Kilogramm realisieren. Die Einzelhändler rangieren auf Platz 2 gefolgt von den Großhändlern. Die Ermittlung der Gewinnspannen unter Einbeziehung der umgesetzten/gehandelten Mengen ergibt ein anderes Bild: In beiden Saisons verdienen die Großhändler am meisten, wobei die zu verteilenden Gewinne in der Saison mit niedrigem Angebot insgesamt höher sind als in Zeiten eines hohen Angebotes. Die Angaben aus den Livelihood-Daten bestätigten die oben genannten Eindrücke. Die ärmsten Akteure in den betrachteten Wertschöpfungsketten sind die Porter', also einerseits Träger, die auf den Märkten die Zwiebelsäcke oder Tomatenkisten von Hand tragen, und andererseits Handkarrenfahrer, die die Waren auf ihren Karren z. B. von dem Großmarkt zum Marktstand des Einzelhändler fahren. Die qualitativen Interviews haben dieses Ergebnis klar unterstützt. Diese Situation stellt sich im Ländervergleich sehr ähnlich dar. Als ein wesentliches Ergebnis ist festzuhalten, dass die Landwirte nicht zu den ärmsten Akteuren beider Wertschöpfungsketten gehören, obwohl es sich hauptsächlich um Kleinbauern handelt. Diejenigen Landwirte, die Gemüse als cash-crops anbauen verfügen im Vergleich mit vielen Akteuren des informellen Sektors über eine gute Faktorausstattung.

In Bezug auf die Marksteuerung des Gemüsesektors konnte festgestellt werden, dass dieser Markt von keiner staatlichen Mengen- oder Preisregulierung beeinflusst wird. Viele Akteure im Bereich Handel und Transport agieren im informellen Sektor. Standards in Bezug auf die Lebensmittel selbst oder auf Gewichtseinheiten existieren, sind jedoch bei den Akteuren wenig bis gar nicht bekannt. Demzufolge wurde gegenwärtig kein positiver ‚trickle-down' Effekt des Exportsektors auf die Entwicklung/Umsetzung von Standards auf den nationalen Märkten festgestellt. Die Nachfrage nach Tomaten und Zwiebel ist generell recht hoch, eine spezifische Nachfrage z. B. in Bezug auf die Lebensmittelqualität spielt im Marktgeschehen eine eher untergeordnete Rolle. Eine Ausnahme bildet hier die Nachfrage nach tansanischen Zwiebeln in Kenia. Diese Zwiebeln sind von höherer Qualität (Lagerfähigkeit, Aussehen) bei in etwa gleichem Preis / kg, so dass sie sowohl von Händlern als auch Konsumenten preferiert werden und die Märkte Nairobis und des Umlandes beherrschen. Bei diesem Handel sind beim Grenzübergang weitere Akteure tätig (‚clearing agents'), die damit ein profitables Geschäft betreiben. Die kenianischen Zwiebelproduzenten erfahren durch den Import aus Tansania eine große Konkurrenz, auf die sie sich durch Diversifizierung einstellen müssen.

Die Forschungs- und Handlungsvorschläge basieren auf den identifizierten Engpässen und Entwicklungsmöglichkeiten. Beispielsweise ist der Gesichtspunkt des Vertragsanbaus sehr kontrovers diskutiert worden. Die Landwirte stehen dieser vertraglichen Bindung sehr skeptisch gegenüber, während viele NGOs und staatliche Akteure darin eine Chance zur Verbesserung und Stabilisierung der Situation von Landwirten sehen, vor allem von Kleinbauern. Eine weiterführende Untersuchung könnte helfen, diese Fragen zu klären, aus welchen Gründen lehnen viele Landwirte den Vertragsanbau ab bzw. wie müsste gestaltet sein, damit er eine größere Akzeptanz erfährt. Als zweites Beispiel hat das Projektteam bei unterschiedlichen Akteuren der Wertschöpfungskette einen Bedarf an Fremdkapital festgestellt. Es geht oft um kleine Beträge, die durch den begrenzten Zugang zum Finanzsektor schwer zu bekommen sind. Bauern müssen ihre Inputs finanzieren oder Einzelhändler benötigen Bargeld, um ihre Tagesware auf dem Großmarkt zu kaufen. Dieser Nachfrage stehen unterschiedliche Angebote von Banken und Mikrofinanzinstitutionen gegenüber. Bei den Anbietern von (Klein-)Krediten konnte festgestellt werden, dass diese sich durchaus auf die Bedingungen ihrer Kunden einzustellen versuchen. Dennoch klafft eine Marktlücke zwischen Angebot und Nachfrage bei Mikrofinanzdienstleistungen. Ein Implementierungsvorschlag ist, auf dem Großmarkt in Nairobi direkt mit Kunden in Verbindung zu treten bzw. die Information über die Angebotsvielfalt zu verbessern.

Arusha Central Market, Tanzania
(Source: SLE-Team)

Contents

Figures

Tables

Boxes

Abbreviations

AVRDC-RCA	The World Vegetable Centre – Regional Center for Africa, Tanzania
BEAF	Beratungsgruppe Entwicklungsorientierte Agrarforschung (Advisory Service on Agricultural Research for Development)
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit (Federal Ministry for Economic Cooperation and Development)
C	Celsius
CBT	Cross-border trade
CU	Costums Union by EAC
DAC	OECD Development Assistance Committee
DC	Development Cooperation
EAC	East African Community
FCI	Farm Concern International
FFV	Fresh Fruits and Vegetables
GDP	Gross Domestic Product
GOK	Government of Kenya
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (GmbH)
ha	Hectare
HCDA	Horticultural Crops Development Authority, Kenya
icipe	African Insect Science for Food and Health, Kenya
ICRAF	World Agroforestry Centre
IFPRI	International Food Policy Research Institute
KACE	Kenya Agricultural Commodity Exchange

KARI	Kenya Agricultural Research Institute
KBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Service
KHDP	Kenya Horticultural Development Program
KIPRRA	Kenya Institute for Public Policy Research and Analysis
km²	Square kilometre
KRA	Kenya Revenue Authority
KSH	Kenyan Shilling
LDC	Least Developed Countries
LH	Livelihooh
MoA	Ministry of Agriculture, Kenya and Tanzania
n.d.	no date
NCC	Nairobi City Council
NGO	Non-Governmental Organisation
NSGRP	Tanzanian National Strategy for Growth and Reduction of Poverty
OECD	Organization for Economic Cooperation and Development
PRSP	Poverty Reduction Strategy Paper
PPP	Public-Private Partnership
PSDA	Private Sector Development in Agriculture
SACCOS	Savings and Credit Cooperation Societies
SLE	Seminar für Ländliche Entwicklung (Centre for Advanced Training in Rural Development)
TSH	Tanzanian Shilling
TRA	Tanzania Revenue Authority
TZ	Tanzania
USD and US$	U.S. Dollars
VC	Value Chain

Glossary

Broker: A broker is a VC supporter who does not own the product at any point in the chain. His role is to connect buyers and sellers and in some cases to negotiate prices either in the name of the buyer or the seller. He is paid a commission by either party. The level of commission varies from place to place and in accordance to supply and demand situations.

Brokers work at farm level connecting producers and traders and also on markets e.g. linking an intermediary with a wholesaler.

Buyer: Any person who purchases or intends to purchase horticultural produce for use or resale.

Bucket: A small, not standardised unit to sell vegetables. A bucket contains between 1 and 7.5 kg of tomatoes or onions.

Cess: This is a fee to be paid in Kenya when crossing district boundaries within the country. The introduction of this fee goes back to colonial times to keep local produce in the district of origin and to hinder trade.

Clearing agent: A clearing agent is a VC supporter who works at a country's border. The agent's customers are traders involved in cross-border trade. Since the CBT procedure is quite complicated this agent provides a special service by way of completing the forms required for commodities to cross the border. The traders pay a commission to the agents.

Cross-border Trade (CBT): describes regional trade between neighbouring countries. In statistical terms the CBT is subsumed under domestic market.

Domestic market: The domestic market includes all trade mechanisms within one country, excluding exports and imports. The CBT is a special case of domestic market.

EurepGAP is a private sector body that sets private voluntary standards for the certification of agricultural products. EurepGAP is a series of specific pre-farm-gate certification standards that have been developed by retailers from the European Union, in partnership with agricultural producers. (http://www.eurepgap.org/Languages/English).

Fresh products are crop produce other than those processed, dehydrated, canned, bottled, frozen, processed or treated in any manner.

Hawkers are retailers who sell at the roadside without a booth, walking around and approaching potential customers. Hawkers work in the informal sector.

Horticulture: Cultivation of vegetables, fruits, flowers, herbs, spices, nuts and any other horticultural crops. "Horticultural" shall be construed accordingly.

Informal sector: The following understanding of the informal sector is laid down in the present study: typically not registered and very small-scale enterprises or self-employed people. Casual workers belong to this segment as well as hawkers who operate at a certain location. Both are very flexible in what they do and at the same time they face high insecurity with regard to income. In contrast to the informal sector supermarkets represent the formal sector.

Input Suppliers: Firms that provide raw materials and inputs used in production.

Intermediaries: In contrast to brokers, intermediaries take ownership of the product at the time they receive it. An intermediary buys directly from farmers, brokers or from other intermediaries at local and regional markets. He sells to other intermediaries, large suppliers, institutional consumers, and entrepreneurs or persons at the retail level.

Markets / market relationships: A market is the interaction of demand and supply (buyers and sellers) of particular types of goods or services. The exchange rules differ depending on the character of the good traded (e.g. commodities, perishable products, investment goods or services). There are different forms of market relationships: The basic market transaction is a once-off purchase of a product displayed by a seller, e.g. in a traditional street market (so called arms-length market relationship in a “wet market”). Sophisticated forms of market relationships include order contracts or regular subcontracting.

Mkokoteni is the kiswahili word for handcart drivers. They are part of the porter group who are engaged in transporting the commodities from the wholesale to the retail markets or kiosks.

Product is a generic category comprising physical, tangible products as well as services sold to customers. The value chain is defined by a product or group of products, e.g. a tomato value chain or a fresh vegetable value chain.

Profit: The profit is calculated by each actor group as follows: profit = sales revenue – (total) costs. Due to the fact that most of the enterprises involved in these chains work in the informal sector, the total cost normally covers the variable costs related to the products reviewed. The profit is calculated for both per kg and includes the volume of product sold.

Profit share or share of profit: These figures indicate how different actor groups perform within the chain. The shares are shown as a percentage of the total profit within one particular chain.

Pro-poor growth (PPG) is the most commonly quoted objective of *value chain promotion*. There is a relative and an absolute concept of pro-poor growth. The relative concept states that economic growth is pro-poor if poor people increase their incomes above the poverty line, even if their share in the national income does not improve (a positive growth rate for poor). The absolute concept states that growth is pro-poor, when the income of the poorest (e.g. of the lowest quintile in a population) increases at least equally or more than the average income. (such that inequality is reduced). PPG stresses the need to make the poor participate directly in the economic growth, and does not rely on social transfers.

Retailer: Retailers sell small quantities either directly to individual, household or institutional consumers. This function is undertaken by a wide range of actors, depending on the point of sale along the supply chain. These may include farmers, traders at various levels (roadside and market places), kiosk/green grocer operators, and supermarkets.

Scale of Production (small- , middle- large scale): In this study the scale of production is defined according to respondents' own perception.
In both countries and for both value chains the following scales were identified:
small scale: 0.25 to max. 3 acre
middle-scale: 3 to max. 5 acre
large scale: more than 5 acre

Standards are a means of defining and regulating product quality by specifying the characteristics which a product or the process of making it must have. This regards intrinsic as well as ethical attributes. Business linkages in value chains have to observe product safety standards, as well as product quality standards and ecological and social standards wherever applicable. Once standards have been formulated and agreed upon, they still have to be implemented – and the compliance with standards verified.

Another important standard is related to measuring the produce sold. Weighing scales are not used frequently, but bags for onions and crates for tomatoes with varying and not standardised volume.

Traders stand for all VC actors working at trade level. This includes *intermediaries, brokers* and *wholesalers*.

Value chain (VC)

A value chain covers two perspectives:

- a *sequence of related business activities (functions)* from the provision of specific inputs for a particular product to primary production, transformation, marketing, and up to the final sale of the particular product to consumers (the functional view on a value chain).

- the *set of enterprises (operators)* performing these functions i.e. producers, processors, traders and distributors (retailers) of a particular product. Enterprises or operators are linked by a series of business transactions in which the product is passed on from primary producers to end consumers (institutional view).

Value chain map / value chain mapping

The value chain map is a visual representation (chart) of the *micro and meso levels* of the *value chain.* According to the definition of the value chain it consists of a functional map combined with a map of *VC actors*. Mapping can but does not necessarily include the *macro level* of a *value chain*.

VC actors summarizes all individuals, enterprises and public agencies related to a *value chain*, in particular the *VC operators*, providers of *operational services* and the providers of *support services*. In a wider sense, certain government agencies at the *macro level* can also be seen as VC actors if they perform crucial functions in the business environment of the value chain in question.

VC operators are all enterprises and persons performing the basic functions of a *value chain*. Typical operators include farmers, small and medium enterprises, industrial companies, exporters, wholesalers and retailers. They have in common that they become owners of the (raw, semi-processed or finished) product at one stage in the VC. Thus, there is a difference between operators and "operational service providers", the latter being subcontracted by the VC operators.

VC supporters provide VC support services (also called support service provider) and represent the common interests of the *VC actors*. They belong to the *meso level* of the value chain.

Wholesalers: In this study a wholesaler is defined as an *intermediary* operating only at the wholesale market. He buys from *intermediaries* and often enlists the assistance of a market *broker*.

1 Unfolding the Map: Introduction

1.1 Objectives of the Study

The present study analyses the value chains (VC) of tomatoes and onions on domestic markets in Kenya and Tanzania. The value chain approach is applied to fresh (i.e. not processed) vegetables from production via transport, trade and marketing to the consumption level. The first objective is to describe in detail how these domestic chains function and who the actors are – the poor actors in particular. Secondly, it identifies bottlenecks the actors face. Thirdly, opportunities are determined to reduce poverty within the chains. Further information provides the chains' comparison by country. Additionally, the study considers cross-border trade of onions from Tanzania to Kenya. This regional trade is subsumed under domestic trade and not as export business.

GTZ-BEAF (Beratungsgruppe Entwicklungsorientierte Agrarforschung) commissioned the SLE-team to carry out this study. The two international agricultural research centres, the African Insect Science for Food and Health (icipe) in Nairobi/Kenya and the World Vegetable Center – Regional Center for Africa (AVRDC-RCA) in Arusha/Tanzania are the cooperation partners in the respective countries. Additionally, GTZ Programme for Agricultural Policy Promotion of Private Sector Development in Agriculture (PSDA) in Kenya has played a supportive role, as well as the Kenyan Ministry of Agriculture (MoA).

1.2 Structure of the Report

Chapter 2 ("Mapping the context") classifies the report within the context of poverty reduction within a market-driven development and describes the report's relevance in the horticultural sector. Chapter 3 ("Understanding the Map") describes the methodological approach the study team applied. The main findings are presented in chapter 4 ("Mapping the Value Chains") beginning with the similarities of all VCs reviewed in this study. The following sub-chapters are distinguished according to the crops and the countries. The cross-border trade for onions from Tanzania to Kenya is a very special issue of concern and highlighted in chapter 5. Chapter 6 ("Conclusions") refers to the previous results in order to compare the value chains by country and to identify the chains' opportunities and bottlenecks. The recommendations (chapter 7) at the end are addressed to the research institutes and other actors involved.

1.3 Study Concept

The study project is carried out by a team of junior professionals participating in this year's training course of the Centre for Advanced Training in Rural Development (SLE) at Humboldt University Berlin. The SLE is committed to professional training, research and consultancy in the field of international development cooperation. The one-year course includes the study of communication techniques, as well as methods of analysis and management approaches. The training content is divided into topics and based on the concept of learning by experience. Thus, the three-month overseas projects are a key component of the training course. The participants work in small groups for international projects and organisations and in the process put their knowledge into practice. The interdisciplinary team carrying out this study in Kenya and Tanzania consists of 5 team members and the team leader.

After a preparatory phase of six weeks in Berlin, the team arrived in Kenya on the 24th of July 2007 and started working directly. The project period is fixed at three months. The time schedule in the annex indicates details of the time spent in Kenya and Tanzania (Annex III).

Both partners in the host countries, icipe and AVRDC, carry out a range of economic research activities in the horticulture sector in East Africa. icipe activities have concentrated on the economic impact of biocontrol strategies in the domestic sector as well as the impact of international standards at the production level; AVRDC activities include value chain analysis of indigenous vegetables. However, the centers feel that due to a growing domestic demand for vegetables this part of the sector also warrants detailed research. At the same time the centers realise that constraints to meeting this increasing (urban) demand go beyond the farm-gate level.

According to the Terms of Reference and the research centres' mandates the study's scope is to investigate in horticulture to reduce poverty. The focal points of this study are:

- Who are the poor?
  It is essential to define who the poor in the value chains are. Chapter 3 (Understanding the Map: Methodology) describes how the study tackles this issue.
- How is profit distributed along the value chains' actors?
  Relating to the question above it is necessary to know who profits from the economic activities in the value chain and who earns how much and how do prices and margins change along the chain.
- How is power distributed along the value chains?
  Poverty is not solely defined according to economic conditions but also in terms of

the bargaining power or the possibility to choose between various economic activities.

- How market-driven are the value chains?
  As the study focuses on market-driven development consumer demand is a crucial aspect to be considered. What influence do customers have on other steps in the value chain, particularly on production? Are producers aware of these demands and how are they able to react to them?
- What relevance do legal regulations and standards in particular have on the chains?
  Bearing in mind that the value chains operate within a widely unregulated, liberalised market, it is assumed that legal regulations have an impact on the chains. What is the frame set by the authorities? Which standards in terms of measuring commodities or food quality do exist and which are implemented?
- In addition, two other aspects are reviewed in the study:
- Examination of cross-border trade between Tanzania and Kenya as a part of the domestic market
- Comparison of the product specific chains by country

The two commodities, tomatoes and onions, were selected for the study because of their domestic as well as regional importance in terms of production volume and value. Based on this the study develops recommendations about potential channels to improve the respective value chains in order to achieve improved distribution of revenues for decreasing poverty among the value chain actors.

2 Mapping the Context: Background

2.1 Defining Poverty

German development policy having committed itself to the Millennium Development Goals (MDG) formulates poverty reduction as its overarching goal[1].

The term “poverty” has been widely discussed in literature[2], reflecting the problems inherent in reducing a complex real-life phenomenon into scientific usable variables. This is not the place to revive this discussion. Albeit the existence of very different definitions of poverty, each with their respective arguments in favour of and against it, the definition of the OECD Development Assistance Committee (DAC) is used in this study in order to capture the many facets of poverty.

The OECD definition of poverty as being “the inability of people to meet economic, social and other standards of well-being” (OECD 2001: 37) adopts a multi-dimensional approach. It takes into consideration that poverty not only affects and is affected by the level of income but that it also implies deprivation in economic, human, socio-cultural, political, and protective means with gender and environmental aspects being cross-sectional issues. This definition corresponds largely to the asset system of the livelihood approach which the research team used in this study to identify the poor in the value chains (see chapter 3.2).

[1] MDG 1: Eradicate extreme poverty and hunger.
Reduce by half the proportion of people living on less than a dollar a day
Reduce by half the proportion of people who suffer from hunger,
Source: http://www.un.org/millenniumgoals/#)

[2] The general competing approaches all use a fixed poverty line (such as consumption, income or vulnerability level) under which those people fall who are then considered to be poor (Cp. OECD 2001: 41). However the lines used and the indicators to measure if people reach the line are different ones. Measuring poverty is a task that always has to strike a balance between integrating the variables which shape the complex realities of poor peoples’ lives and keeping them simple enough to be able to calculate the data.

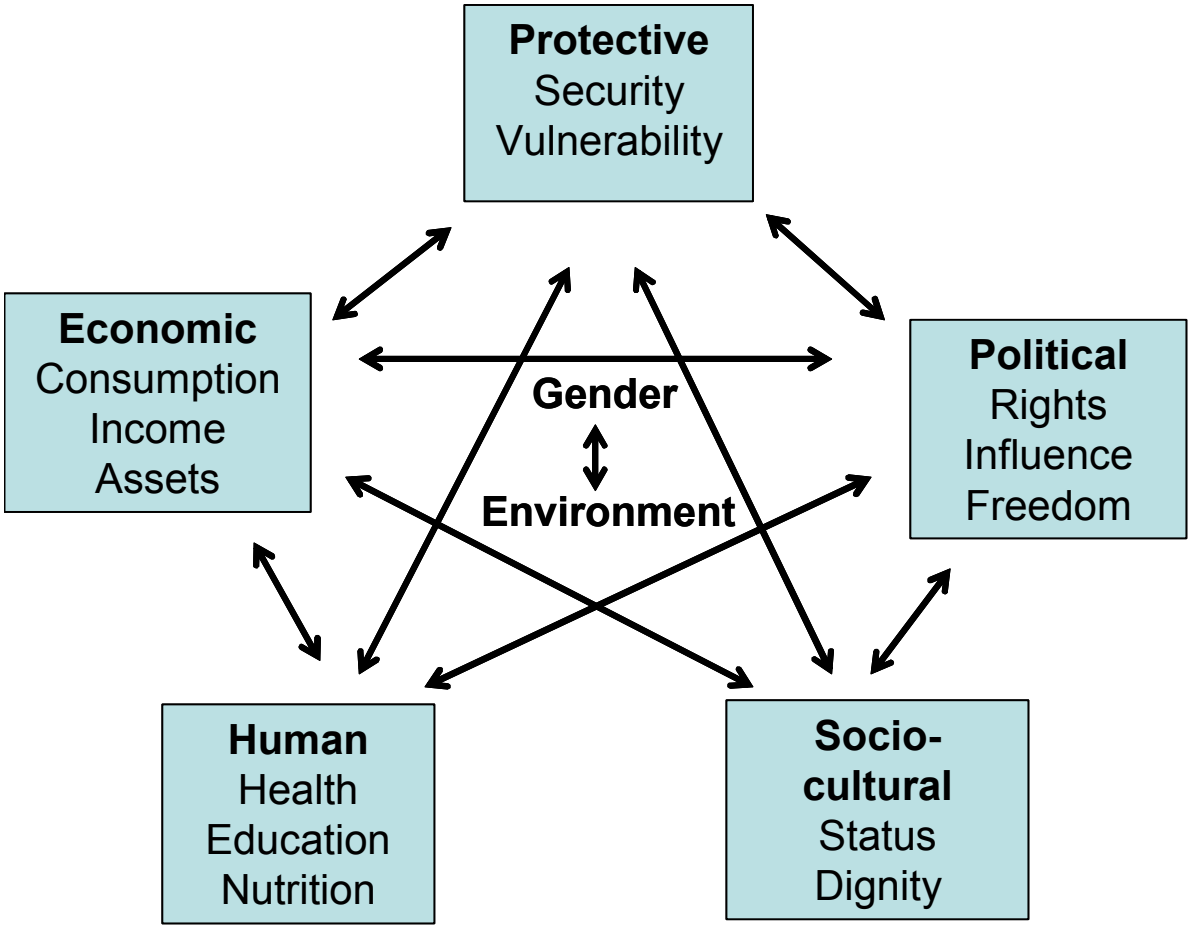

Fig. 1: Multi-dimensional Approach to Poverty
(Source: OECD 2001: 39)

Poverty as described above reflects an endangering of dignified human survival. A poor person is deprived not only of a stable, adequate income but also of her chances to choose from a wide array of possibilities as to how to live her life (Cp. SEN 2000: 3). Development in this scenario must mean that a person is able to broaden the array of choices available for her life. It therefore becomes clear that reducing poverty is not only an issue of raising income levels but an overarching goal to which various aspects of development cooperation contribute.

The study presented here has tasked itself with reducing poverty. This is done by providing development cooperation actors with specific but multi-faceted information needed in the sector of horticulture in Kenya and Tanzania. These might then contribute to reducing poverty.

The purely income poverty situation in Kenya and Tanzania is still one that merits heightened attention from both national governments as well as from the donor community. World Bank indices rate both countries as least developed countries (LDC) with a gross domestic product (GDP) per capita of 1,200 U.S. dollars

(Tanzania: 800 $)[3] (CIA 2006). About 36%[4] of the population in Tanzania[5] and 50%[6] in Kenya fall below the respective poverty lines (IBID.).

In both countries poverty is more widespread in rural than in urban areas. As the majority of Tanzanians (65.7%) (IFPRI 2006: 98) and Kenyans (~80%) live in rural areas which depend heavily on agriculture as the major employment creation sector (CEC DG-RELEX, 2002: 12; 2003: 8), it is therefore logical to discuss the role that agriculture could play in reducing poverty. And especially in this case where a reduction that is achieved through pro poor growth strategies means growth from which the poor profit in a super proportional way.

2.2 Agriculture and Horticulture in East Africa

Keeping in mind the data on GDP shares of agriculture (and here specifically horticulture) in Kenya and Tanzania presented above, the relevance of improving the agricultural sector in order to reduce poverty should be quite clear. Horticulture as a sub sector of agriculture plays a dominant role here.

Tomatoes and onions as such are relevant for the domestic markets in East Africa (including regional trade). Climatic conditions of semi-arid zones, good soil quality and sufficient water are essential to cultivate these crops. Compared to the total arable land available in Kenya and Tanzania, the production areas fulfilling these conditions are perceived as high potential areas. However recent discussions have argued as to whether concentrating on agricultural growth[7] will really bring the development successes hoped for. This is because, while the agricultural sector played an important role in the success stories of some Latin American and Asian countries, the majority East African countries seem not to be on this track yet (Cp. DIAO ET AL. 2006: 1).

As LEWIS concludes that "industrial and agrarian revolutions always go together and […] economies in which agriculture is stagnant do not show industrial development" (Lewis 1954: 433), this finding is a major constraint for economic development in East Africa.

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[3] 2006 est.

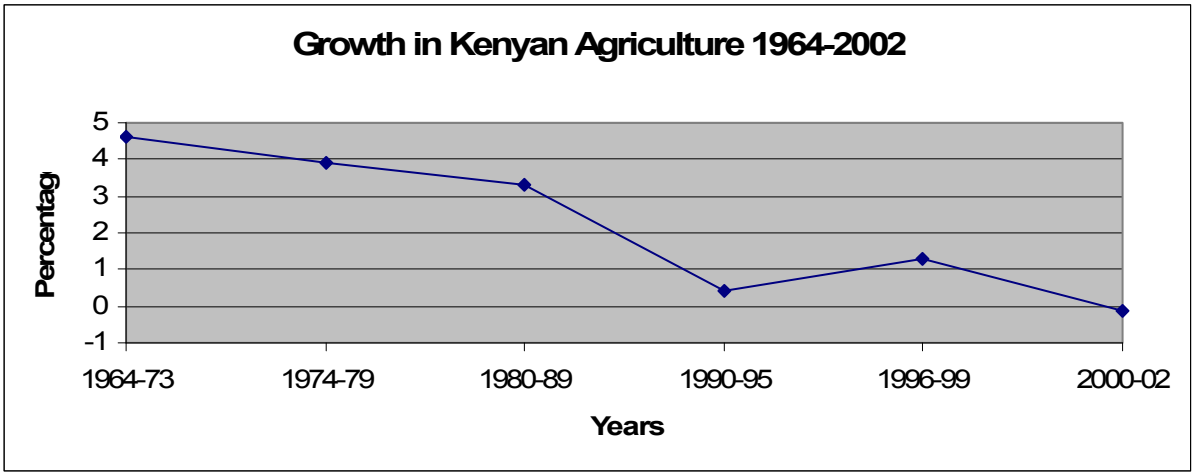
[4] 2002 est.

[5] Mainland only

[6] 2000 est.

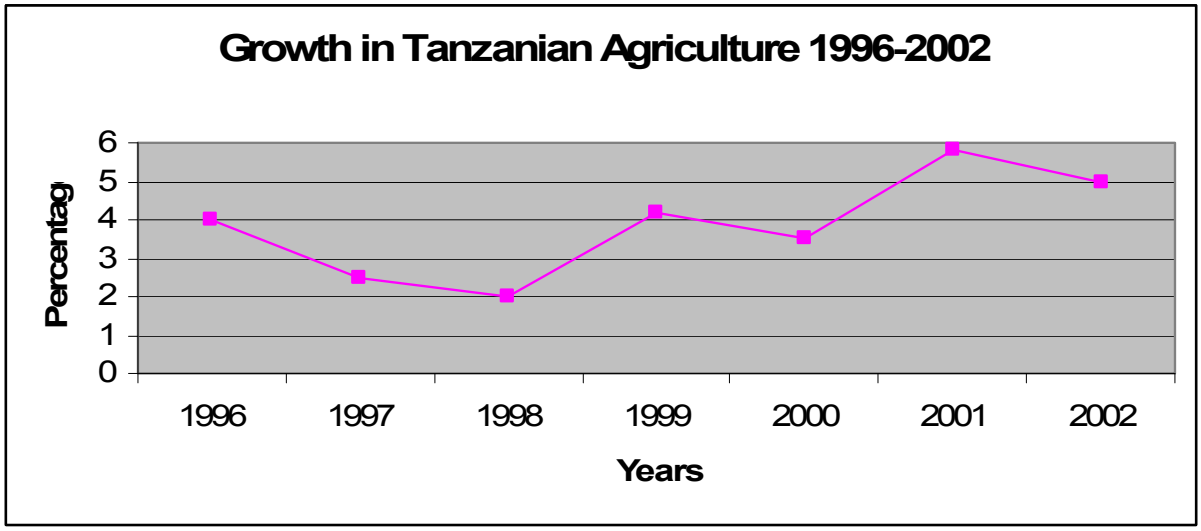
[7] Development theory has discussed in depth the question as to what drives economic development. While there is still no common opinion on all the sufficient conditions (e.g. macroeconomic stability, property rights, a good investment climate, an incentive framework, functioning factor markets, broad access to infrastructure and education to name a few) for development, there is plenty of empiric evidence that a rapid sustained economic growth combined with low initial inequality ratings can contribute to a pro-poor growth (Worldbank 2005).

Table 1: Growth in the Kenyan Agriculture



(Source: Own computation from MoA data material)

Table 2: Growth in the Tanzanian Agriculture



(Source: Own computation from MoA data material)

Also IFPRI highlights that broad-based agricultural growth, particularly in conjunction with growth in the non-agricultural sector, could contribute significantly to growth and poverty reduction (2006: 2). For Kenya we find that growth multipliers from the agricultural sector to the whole economy are two to three times higher than those from non-agricultural sectors (KIMENYI 2002: 3).

Turning our attention once again to Tanzania and Kenya we find agriculture to be the main employment sector in the two countries. It accounts for around 75 (Tanzania) - 80% (Kenya) of all jobs (CIA 1&2:). 24.1% of GDP in Kenya and 60% of GDP in Tanzania are based on agriculture (CEC DG-RELEX, 2002: 12; 2003: 8), even while – especially in Kenya - there have been significant setbacks in agricultural growth in the last few years (NAFULA ET AL. 2005: 5; PRSP webpage: 12). Since horticulture is an important and growing sub sector of agriculture it represents a major share in this

in Kenya and Tanzania. General income in the horticultural sub-sector is higher then in cereal production (WEINBERGER/ LUMPKIN 2005: 1) and poverty rates in the horticultural sector tend to be below national averages (ACHTERBOSCH ET AL. 2005: I). The significance of the horticultural sub-sector compared to others within the agricultural sector has increased during the past years.[8] This development is brought about by a rise in global demand for horticultural products due to liberalisation in international trade (WEINBERGER/ LUMPKIN 2005: 12). In most East African domestic markets horticultural demand has also increased as a result of urbanisation and growing middle classes (IBID.).

This enforces the belief that the potential for poverty reduction is significant in horticulture. Much has been written in this respect on the export market for horticultural commodities as the high demand on the global market coupled with higher prices and the stricter standards which often require the creation of additional jobs appear to be more promising for poverty reduction than the domestic market.

However, horticultural small holders – who account for the majority of the farmers in Kenya and Tanzania – often do not have access to export markets due to the high standards mentioned and investments necessary to reach adequate market channels. While returns from the domestic market are normally lower than the high prices offered in export (ACHTERBOSCH ET AL. 2005: 63) domestic street retail still offers great potential (Ibid: 51) for those engaged in horticultural production.

As both the commodities – tomatoes and onions – discussed here are important cash crops in Kenya and Tanzania the opportunities for poverty reduction are obvious. The development of local markets and the provision of functioning and accessible market channels for these products therefore would appear to be in line with a poverty reduction agenda (cp. ACHTERBOSCH ET AL. 2005a: 2; WORLDBANK 2005: 11).

2.3 Market-driven Development in Horticultural Value Chains

The value chain approach analyses a product's development from input through production and processing level, transport, trade and marketing, to consumption. This study adopts the development research approach to find out more about the link between market-driven development and poverty reduction in the horticultural sub-sector using tomatoes and onions as an example.

Despite the fact that earlier work on agriculture concentrated mainly on improving the supply side of the respective value chains e. g. production conditions and output,

[8] I.e. even whilst growth rates in the agricultural sector decline, the horticultural sub sector grows.

recent studies have also paid attention to the demand side (DIAO/ DOROSCH 2007; TSCHIRLEY ET AL. 2004b). Here the value chain analysis concentrates on both ends of the chain corresponding with the two sides of a market.

The development of the domestic markets in Kenya and Tanzania is strongly determined by factors on the supply side, e.g. soils, aridity, specific agricultural knowledge, competition, weather, and market infrastructure as well as on the demand side e. g. increase in population, urbanisation, and income-elasticity. As highly perishable commodities tomatoes face many difficulties during the marketing process which is part of this analysis. Onions are of special interest for the study because of their importance in cross-border trade. Even though transportation is the highest cost factor, trade from Tanzania to Kenya is still profitable. Because of high Kenyan demand and low Tanzania production costs it continues to grow.

Free markets versus regulations

Since ADAM SMITH it has been an article of faith for many economists that free market forces are the only path to development. In the field of international trade theory DAVID RICARDO proved with his principle of competitive advantage that free trade will improve the lot of all national economies. In order to avoid the stigma of parochialism many economists subscribe to the view of FREDERICK LIST in emphasizing the importance of protectionism in nurturing an economic sector until it has reached a certain level of competitiveness. Government regulations of course not only influence international, but also domestic markets. Investment in hard and soft infrastructure such as roads and education strengthen markets. Road and market fees, as well as the need for business licenses and the enforcement of laws concerning a certain sector are often perceived as constraints.

The agricultural sector in particular, including the horticultural sub-sector, is often highly subsidised and over-regulated by the state because of macro-economic considerations as well as food security. India for example “swallows” 20 % of its federal revenues for agricultural output subsidies (Operationalising Pro-Poor Growth (OPPG) program 2005: 49). The member states of the European Union and other industrialised countries protect their agricultural markets against imports from less developed countries, which have competitive advantages due to lower labour costs and a better climate. Also, developing countries protect their markets against other competitors. Regulations in international and domestic markets not only slow down the market activities of all actors involved but also lead to inefficiencies and corruption. The Kenyan and Tanzanian governments promote free trade among the East African Community member states. Therefore any obstructive regulations are planned to be reduced or at least harmonised. Within the framework of a liberalised global economy, the most challenging question for development policy is how to

make this process more socially inclusive (BMZ 2007). Tomato and onion production, trade, and even transportation have to be analysed according to their exclusiveness. Not only regulations but also market dominating non-governmental actors could play a major role in protecting domestic markets and also cross-border trade.

For example, if some actors are too weak to react fast enough to market forces, which might exclude them from these markets. Especially in terms of labour rights, consumer protection, and the conservation of the environment government regulations are needed. In the case of cross-border trade in onions the issue of the Kenyan farmers has to be addressed. Market-driven development in tomatoes should not lead governments and consumers to ignore pesticide abuse among the farmers. Even though market-driven development has the overwhelming advantage that demand is basically initiated and driven by consumer needs and suppliers interest in profit, and not only through state intervention. The value approach looks for instruments to regulate or govern markets that should be guided by including as many stakeholders as possible.

The supply side in the horticultural sub-sector

Concentrating on market forces in horticulture, it has to be said that natural occurrences such as aridity, the composition of soils, and the weather are mainly responsible for creating opportunities and constraints on the supply side of the market. Seasonality strongly influences the supply side of the horticultural sector, especially of the commodities concerned. Tomatoes and onions have demonstrated proven price elasticity, caused by the additional costs the farmers face in the dry, respectively rainy seasons. The supply of onions for example follows the season of the different production sites.

Meeting of supply and demand

Furthermore the importance of market co-ordination and market participation has been highlighted and described as one of the most important constraints responsible for the poor performance of the African agricultural sector (DORWARD ET AL. 2005). According to estimations by KELLEY AND BYERLEE (2004) some 60 % of the African rural population live in areas of good agricultural potential, but with poor market access. Only 23 % live in areas of good agricultural potential and good market access. 18 % suffer poor market access and poor agricultural potential. Effective marketing is required in order to feed the growing number of urban Africans.

Demand

As mentioned in the previous chapter (2.2) domestic demand in horticulture has increased particularly due to the growing middle-income class. Because the “income

elasticities of demand for fruits and vegetables are generally high" (MUENDO/ TSCHIRLEY 2004c: 2), while the demand for grain products for example is income-inelastic (DIAO/ DOROSH 2007: 288). As long as growth is pro-poor and lifts the poorest out of poverty, it will contribute disproportionately to the domestic demand in the horticultural sub-sector. Market-driven growth in tomatoes and onions as part of the horticultural sub-sector will lead to a further reduction in poverty.

3 Understanding the Map: Methodology

Value chain analyses typically use maps and tables to illustrate their concepts. To make this visualisation understandable this chapter aims to explain both the value chain concepts and the specific methodological approach developed to meet this study's requirements.

3.1 Value Chain Approach

Since the study deals with fresh and unprocessed vegetables first of all the term 'value' chain has to be explained and distinguished from 'supply' chain. According to GTZ understanding, the supply chain refers to sequences of (upstream) sourcing and (downstream) marketing functions of individual enterprises. Supply chain management is perceived as a business management tool, while the value chain is a development concept with two key perspectives:

- Functional perspective: A value chain is a sequence of related business activities (functions) from the provision of specific inputs for a particular product to primary production, transformation, marketing, and up to the final consumption of the particular product.
- Institutional perspective: A value chain is also the set of enterprises or operators performing these functions. Value chain operators are linked by a series of business transactions in which the product is passed on from primary producers to end consumers. According to the sequence of functions and operators, value chains consist of a series of chain links (or stages) (GTZ VALUELINKS GLOSSARY 2007).

To sum up, the value chain approach considers both the added value of a product and an insight into the actors' roles and relations. The study emphasises the role and relations of the operators, bottlenecks they face and the opportunities within the frame of a market driven development, therefore the value chain analysis is more suitable for this study. The perspective of non value chain actors who might be interested in entering the value chains has not been analysed in this study. Hence, a basic understanding of the actors and their functions is the key result of this study. The issue of access to these chains must be addressed through further studies.

The initial idea of VC analysis

Initially, VC analysis focused mainly on (industrial) production for global markets (KAPLINSKY/ MORRIS 2001). Measures to increase the profit share of developing countries were discussed (IBID: 38) and in particular how poor actors could benefit

from these changes. By focusing on the dynamics of inter-linkages within the productive sector, VC analysis can move beyond traditional modes of economic and social analysis (IBID: 2). It is a meeting ground for different disciplines (WOOD 2001: 41) because it requires input from economics, natural and social science in order to analyse all the different steps of the VC as well as their governance.

Nowadays, VC analysis is increasingly used as a tool to understand agricultural commodities markets (e.g. USAID 2006, HUMPHREY 2005). The approach not only applies to the concept of global VCs, but it is also useful for the analysis of domestic markets (IBID: 6, STAMM 2004: 15).

With regard to the value chain approach used, an extended VC-approach has been chosen. In the model of a simple VC analysis only one value is added at every step of the VC (KAPLINSKY AND MORRIS 2001: 4). In reality, of course, the complexity of VCs is much greater. In the VCs concerned for example intermediaries involved in the trade of the agricultural products also provide inputs to the farmers. Therefore KAPLINSKY AND MORRIS qualify the extended VC analysis to be superior to the first concerning the degree of complexity (IBID.: 2001: 4-6). The extended VC analysis is often considered to be more accurate in reflecting real processes, while the simple chain does not describe all details. As the interdependencies among the VC actors are complex, the extended value chain approach is used in this study.

The necessity to connect producers to markets underlines the importance of a deep analysis of markets and demand before intervening in VCs. In the following the VCs of tomatoes and onions are consequently analysed from both ends: the production sites and the markets. By following the products from the production areas via distribution channels to the markets and pursuing their way back from the markets to the production sites, the activities and relations of producers, traders, retailers, and consumers are investigated. Contributing to the overall goal of poverty reduction, the survey is conducted with a special emphasis on poor actors also beyond the production level, and the bottlenecks they face.

To distinguish the different actors involved in the analysed value chains the following definitions have been chosen according to the GTZ VALUELINKS GLOSSARY (2007: 6):

VC actor summarises all individuals, enterprises and public agencies related to a value chain, in particular the VC operators, providers of operational services and the providers of support services. In a wider sense, certain government agencies at the macro level can also be seen as VC actors if they perform crucial functions in the business environment of the value chain in question.

VC operators are all enterprises and persons performing the basic functions of a value chain. Typical operators include farmers, small and medium enterprises, industrial companies, exporters, wholesalers and retailers. They have in common

that they become owners of the (raw, semi-processed or finished) product at one stage in the VC. Thus, there is a difference between operators and "operational service providers", the latter being subcontracted by the VC operators.

VC supporters provide VC support services (also called support service provider) and represent the common interests of the VC actors. They belong to the meso level of the value chain.

3.2 Methodological Approach

The research team developed a study concept that was influenced by existing value chain guidelines and VC analyses (M4P n.d., HUMPHREY 2005, GROSSMANN et al. 2000, USAID 2006) as well as by the concept of Action and Decision-oriented Research (ADR) elaborated by the SLE (SLE 2006). Furthermore, feedback and recommendations from German and foreign experts concerning the conceptualisation have been taken into consideration. In order to meet the expectations of different actors who expressed interest in the study findings – the international research institutes, AVRDC, icipe, implementing institutions e.g. GTZ, and political stakeholder such as the Ministry of Agriculture in Kenya and Tanzania – a clear methodological approach was required. Therefore, this value chain analysis is based on a mixed methodology that includes a broad analysis of relevant literature, quantitative methods as well as qualitative methods including participatory instruments.

3.2.1 Qualitative Methods and Participatory Instruments

The qualitative methods applied within this research consist of key resource person interviews and focus group discussions. The latter are supplemented by participatory tools.

In the present context qualitative interviews are characterized as semi-standardised verbal questionings of actors who are crucial or possess knowledge relevant to the understanding of the tomato and onion value chains in Kenya and Tanzania. The conversations can be characterised as problem-centred interviews structured with guiding questions. The interviews have been carried out in a flexible and adjustable way, allowing dialogue between interviewer and interviewee(s). The guidelines are based on the study's focal points (see chapter 1.3) and are aimed at identifying the functional and institutional perspectives of the value chains. For this they focus on linkages and relations between the research subjects, i.e. actors, on power and profit distribution and on constraints and potentials within the VCs.

Respondents of the qualitative interviews were key resource persons from partner institutions (AVRDC and icipe) and other important research institutes (e.g. Tegemeo

Institute and KARI), ministries, and NGOs (e.g. Farm Concern and FAIDA MALI). All these actors operate at the macro or meso level and therefore had a more abstract understanding of the VCs. Furthermore, we interviewed experts who act mainly at micro level such as representatives of market authorities, regional, district and village administration as well as village chiefs, public and private extension services, and informal or formal actor groups. A list of all key resource persons interviewed is attached in annex II.

The elaboration of the qualitative data has been an iterative process. On the basis of the first interview narratives the research foci were modified and new questions for following interviews were formulated and later integrated in the interview guidelines.

The focus group discussions aimed at bringing together the different actors of one VC step in order to discuss the major issues of the study relevant to those actors. The idea was to achieve a more complex understanding of the chosen subjects by eliciting the different opinions of the actors at one time. The group discussions were moderated and documented by members of the research team.

Some of the focus group discussions were planned and prepared in advance, others happened spontaneously. In most of the planned group discussions different participatory tools were implemented particularly Venn-diagram and SWOT-analysis.

The relationship (Venn) diagram was employed to identify institutions, organisations or persons who are important for the group interviewed (e.g. decision maker, informants, suppliers, etc.). The aim was to gain more knowledge about important actors in the analysed value chains as well as to understand the links and relation between the different institutions.

SWOT-analysis was applied in group discussions to identify strengths, weaknesses, opportunities and threats within a local organisation. Strengths and weaknesses focus on internal factors, i.e. how well the organisation functions. Opportunities and threats reflect external forces that can influence the functioning of the organisation in a positive or negative way. The objective was to receive more information about the advantages and disadvantages for actors organised in a group or cooperation and to find out whether cooperation among the actors plays a role.

Group Discussion in Mwea, Kenya
(Source: SLE-Team)

As a first activity, when visiting a village or a market place, the team members carried out transect walks. These served the purpose of becoming acquainted with the location and the local population in order to acquire, through informal talks, some preliminary information about the situation on the ground (e.g. characteristics, problems and potentials of the location). During the walk the surroundings were closely observed, e.g. infrastructure, people's activities, and dwelling conditions. The observations were subsequently discussed and clarified with the local guides.

Detailed notes were taken from all qualitative methods carried out. The study team analysed the qualitative data using the atlas-ti program. This program facilitates marking the interviews with defined codes that are related to the research questions. Using these codes, aspects mentioned in different interviews can be compared easily. Also, it is possible to group codes into "families" that refer to the same topic. Employing this analytical tool enables important over-ranking aspects to be filtered out.

3.2.2 Quantitative Methods

Questionnaires

In order to collect quantitative data three different types of quantitative questionnaires have been created and employed (see annex V). All of them were developed and pre-tested during the first research phase. The most complex one is the so-called value chain questionnaire, which has been employed for actors of every value chain step, such as production, transport, trade, and marketing. It contains chapters related to the functions of the particular value chain step, i.e. information on crop production

is only asked from farmers. Furthermore, the questionnaires also include chapters which are the same for all value chain steps bringing together specific issues such as profit distribution and price negotiations. The trade and marketing questionnaires are very similar, but as they focus on different steps in the value chain they are considered separately. No questionnaire was designed for the input level but qualitative methods were applied with different key resource persons.

Additionally, a livelihood questionnaire has been designed to assess the socio-economic capital of all actors. This questionnaire relates to the livelihood approach and is based on the assumption that a household possesses five different kinds of assets in order to react to stresses: natural (e.g. climate), physical (e.g. infrastructure, dwelling conditions), financial (e.g. access to credit, savings), human (e.g. education), and social (e.g. social network, membership of organisations).

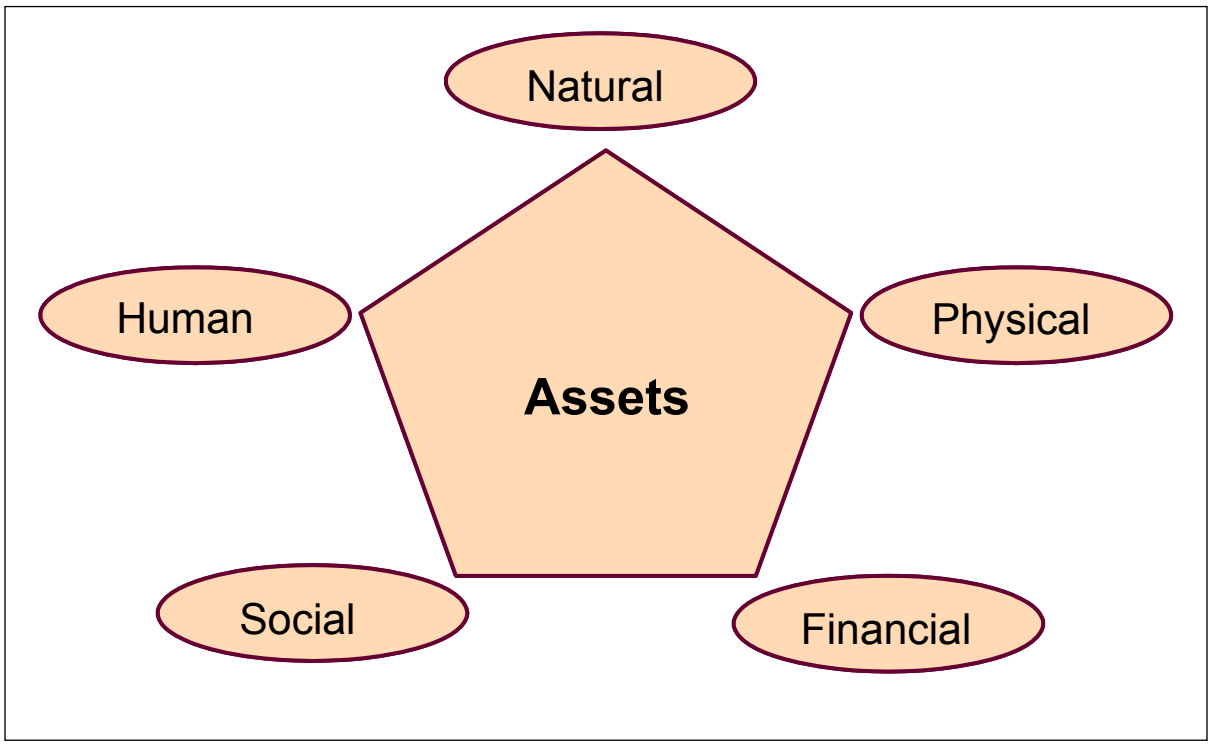


Fig. 2: Five Assets of the Livelihood Approach
(Source: Own outline)

The livelihood questionnaire covers the physical, financial, social and human assets of the value chain actors. The natural assets were not taken into consideration, assuming that the natural capital is quite similar to all relevant actors. Using the livelihood questionnaire, a more holistic and comprehensive understanding of the vulnerability situation of the value chain actors is gained. The questionnaire is identical for all actors in order to be able to identify the poorest and weakest actors in a comparable and consistent way. An interesting side effect of this analysis is to get a picture of the socio-economic constraints the actors have to face.

Taking into account the study focus of market-driven development the research team had to consider demand and thus investigate the consumer aspect. Therefore, a consumer questionnaire was created, containing, among others, questions about demand, customers' behaviour, quality and standards in order to gain a broader picture of the different types of consumers in different market places.

Data Analysis

Matrixes in Microsoft Excel have been developed to analyse all the quantitative data. The matrix for the value chain questionnaires aims at facilitating the comparison of actors of one value chain step as well as between the different steps. Therefore all four VCs are inserted into the same matrix. All costs, prices and profits are calculated in the unit the actors use as well as per kg. Also, fluctuation due to seasonality is taken into account. Furthermore, descriptive data from the questionnaires (e.g. valuation of bargaining power or statements relating to business relations) are also included in the matrix to facilitate a quick comparison.

Similar to the value chain questionnaires an Excel matrix is also used to analyse the consumer questionnaire. Here the buying behaviour and preferences of the consumers are analysed as well as their price expectations.

In order to calculate and compare the living situation of all interviewed actors a special method was developed. For this each potential answer to the livelihood questionnaire receives a score depending on its relevance for the livelihood situation. The maximum score was equated with 100 % so that each actor could be compared to the others. Further information can be found in annex IV. The performance of the respondents can be found in the chapters on the different VCs (4.2 and 4.3).

In order to facilitate the comparison of prices and profit margins between Kenya and Tanzania, all prices have been converted in US Dollar (USD), according to the exchange rate of the 20th of July 2007[9]. The profit is calculated as revenues minus costs related to one kg. Also the profit taking into account the volumes a actor handles has been calculated. To represent all quantitative data the median of a data series is used. This excludes extreme values.

3.2.3 Sampling

In total 101 value chain actors completed both the value chain and the livelihood questionnaire (TZ: 51, KE: 50). 11 workers (TZ: 6, KE: 5) in the production segment and 7 workers (TZ: 3, KE: 4) involved in transportation were asked the livelihood

[9] 1 USD = 1300 TSH = 68 KSH

questions only. Finally, the research team carried out the consumer questionnaire by interviewing 16 (TZ: 8, KE: 8) consumers.

Due to shortage of time and the broad research approach the quantitative study sample concerning each value chain step is relatively small. It has to be taken into consideration that the sample size does not aim to fulfil statistical requirements. The quantitative data are related to the qualitative information with examples and thus enable a better understanding of the VC, especially regarding costs, prices, and profits.

Selection of Survey Areas

The collection of empirical data for the analysis of tomato and onion value chains in Kenya and Tanzania took place in selected production areas and marketing centres.

Table 3: Selected Production Areas and Markets

<table>
<tr><th></th><th colspan="2">Kenya</th><th colspan="2">Tanzania</th></tr>
<tr><th></th><th>Production Area</th><th>Market</th><th>Production Area</th><th>Market</th></tr>
<tr><td>Tomatoes</td><td>Kirinyaga District: Mwea Division.</td><td rowspan="2">Nairobi:
Wakulima and Gikomba Wholesale and Retail Markets
+ Local Markets:
Thika, Karatina and Kutus</td><td>Arumeru District:
Ngari Nanyuki and Nduruma Area</td><td rowspan="2">Arusha:
Kilombero Wholesale and Retail Markets and Arusha Central Market</td></tr>
<tr><td>Onions</td><td>Nyeri North District: Kieni West Division</td><td>Karatu District:
Mang’ola and Baray Area</td></tr>
</table>

(Source: Own outline)

Due to the fact that the two partner institutions (AVRDC and icipe) are based in Arusha and Nairobi the areas researched are located close to these two cities. Moreover, AVRDC and icipe form an important source of knowledge and support to contact key resource persons. Furthermore, the study concentrated on large production areas and markets of regional centres in order to collect relevant consistent and comparable data.

In Tanzania the Arusha market was chosen because of its regional relevance and nearness to the AVRDC. The production areas reviewed in Tanzania are all relevant for the Arusha market. With regard to tomatoes the Arumeru[10] District, in particular the area of Ngari Nanyuki and Nduruma, were analysed. The onion production area

[10] Arumeru District is now divided in two districts, Arusha and Meru. But as the process was not finished during the research period this report still refers to the “old” Arumeru district area.

of Mang'ola in Karatu District was selected because of its dominant role in supplying the Arusha market and additional importance for cross-border trade to Kenya.

In Kenya two major markets in Nairobi were analysed. Wakulima and Gikomba market are both wholesale and retail markets. Wakulima is the most important market for onions in Nairobi, especially with regard to cross-border trade. Gikomba is an important market for tomatoes.

Mwea Division in Central Province is the most important tomato production area supplying Nairobi market and is located close to Nairobi.

As already mentioned in the study, onion cultivation is less important in Kenya than in Tanzania. Therefore it was not possible to find a comparable onion production area in Kenya. Loitoktok and Kieni West are among the most important onion production sites in Kenya. The latter has been chosen because a great deal of research has already been carried out in Loitoktok, so that interest in acquiring more information about Kieni West region was high. An additional feature of Kieni west Division of Nyeri District are its farmers who are more highly organized into groups than in other areas. Investigating this situation has contributed to a better understanding of the question as to whether well organised farmers have more or less influence on profit and power distribution than non-organised farmers.

Selection of Interviewees

The study team identified different actors of every value chain step in order to conduct interviews with representatives of all important actor groups, e.g. for the marketing step: sellers at markets and at road-side kiosks as well as hawkers.

Considering the small sample, a range of extremes, including actors with widely differing socio-economic backgrounds, have been covered to assess the variance across different actors. At production level respondents were selected and contacted after a transect walk and qualitative interviews with the extension service officer or the village chief. For other value chain steps the snowball principle or random selection was applied. For this the study team either directly asked actors, who named other relevant persons they knew, or asked officials, e.g. at the markets, to make the first contact.

Besides the cultivation of tomatoes or onions, selection criteria at production level were applied to cover a broad mix of farmers. They include the following:

- large-scale and small-scale producer,
- members of farmer groups as well as non-members,
- households with different livelihood situation and
- female headed households.

The value chains' input and production level has been investigated and is described in depth as far as this is required to understand the entire analysis. Particularly the two partner institutions had already obtained detailed information in this regard.

At trade level mainly sellers and brokers in the wholesale market were interviewed but also intermediaries and brokers from the production areas. In particular, the sample size for brokers is relatively small because they are not keen to reveal their identity.

For the marketing step the study focuses on sellers at the retail markets analysed, taking into consideration those with a permanent stall as well as hawkers, mainly in Tanzania. Additionally, some kiosk owners in the respective cities were interviewed.

In this study transporters refer to lorry drivers and owners who are involved in the transportation of the commodities from the production areas to the markets, carriers who mainly load and unload the trucks and handcart drivers who normally transport the commodities from the wholesale to the retail markets.

Consumers were only interviewed in urban areas, especially in retail markets and in supermarkets. The study team selected male and female consumers as well as young and old ones.

Interviews with onion wholesalers in Karatina, Kenya
(Source: SLE-Team)

4 Mapping the Value Chains

This chapter describes the study's major finding. Due to the significantly high congruence of the four chains, the chapter starts off with the presentation of the chains' basic structure (4.1). The following subchapters 4.2 and 4.3 provide more detailed information on the particular chains distinguished by the two countries. The entire chapter follows the structure of the value chain, starting with input and proceeding from production to trade, marketing and consumption. The chapter closes with a discussion of the value chains' constraints and opportunities.

4.1 The basic structure of the Value Chains

The logical structure of the value chain approach is followed by first describing the functional and institutional perspectives, particularly the typical steps and activities including an overview of the main actors. In the second part of this chapter the most typical relations within and between the actor groups are described. The third subchapter deals with general results of the livelihood analysis from all four VCs. Some remarks on cost, prices and profit margins follow. The last subchapter likewise presents general findings on standard conditions in the VC.

4.1.1 Steps, activities and actors related

The basic VC presented in this study consists of the following steps: input, production, trade, marketing and consumption, with transport as a cross-sectional issue involved in several steps.

Regarding **input**, large supply companies for seeds, fertiliser, and pesticides play the role of VC supporters. They sell these inputs but also provide information concerning their use. Yet there is a host of problems related to the accuracy of information provided to the farmers. Input suppliers promote intensive chemical application. But farmers and extensionists throughout the research areas reported increased awareness among the farmers regarding overuse of chemicals in terms of yield uncertainty and health issues.

Public and private extension services are VC supporters at input level as well. However, extension service to horticultural farmers is deficient. The main reason interview partners gave for this is a lack of personnel at the Ministries of Agriculture in both countries. Most farmers stated that for years they had relied on neighbours, friends and relatives for information. Credit institutes also belong to the VC supporters of this step. But their impact is very low, as farmers refrain from taking loans because they fear crop failure and not being able to repay their credits. Another

reason that emerged from the qualitative interviews is that the farmers have too little information about loan conditions.

At **production** level farmers, workers and farmer groups play an important role as operators. In the present study only those farmers were considered who grow either tomatoes or onions as a main cash crop. An assumption of this study is that since the cultivation of these crops requires a certain resource endowment and the ability to cover the necessary input expenses, the farmers interviewed do not belong to the poorest households in the research regions. Nevertheless, most of the farmers are small to middle-scale producers, i.e. they manage their plot within their family or with the help of casual workers. The latter normally also belong to farm households but poorer ones.

Different types of traders work in the **trade** segment. A broker, as a VC supporter, does not own the product at any point in the chain. His role is to connect buyers and sellers and in some cases to negotiate prices either in the name of the buyer or the seller. He is paid a commission by either party (Fintrac HDC 2004, GTZ 2007). It is possible to distinguish between brokers at farm level bringing together producers and traders and brokers at the markets who e.g. link an intermediary with a wholesaler. In contrast to brokers, intermediaries take ownership of the product at the time they receive it. They neither produce the products nor sell them to the consumer (own data collection, GTZ 2007). An intermediary buys directly from farmers, brokers or from other intermediaries at local and regional open markets. He sells to other intermediaries, large suppliers, institutional consumers, and entrepreneurs or persons at the retail level. Often an intermediary is also responsible for the grading. In this study a wholesaler is defined as an intermediary operating only at the wholesale market. He buys from intermediaries and often enlists the assistance of a market broker.

At retail or **marketing** level the operators are to be differentiated according to their location and/or the volume they trade. There are sellers on open markets, roadside sellers with small wooden kiosks and hawkers. The latter sell at the roadside without a booth, walking around and approaching potential customers. While the first two operate in the formal sector the hawkers work in the informal one. In addition, supermarkets are part of the formal retail sector but they do not play an important role for the supply of FFV. The smaller ones do not even offer FFV but there are kiosks located next to them. Most of the vendors on the retail markets specialise in some products and only change their range in the off-seasons. The range they offer and the amount they sell also depend on the kind of stall they own. Kiosk retailers normally only sell FFV and try to have a large selection of products to meet their customers' needs. As hawkers depend on their mobility in general they have only few

commodities to offer. Big supermarkets in contrast often supply – besides the local or seasonal FFV – also “exotic” ones like apples or strawberries.

Wholesalers at Nairobi Wakulima Market, Kenya
(Source: SLE-Team)

Hawkers at the entrance to the Kilombero Wholesale Market, Tanzania
(Source: SLE-Team)

On the **consumption** side individual and large consumers such as hotels, restaurants, hospitals and schools are considered. Most consumers buy FFV at retail but also at wholesale markets, at kiosks or hawkers. Almost no consumers purchase FFV in supermarkets. Decisive criteria when choosing the seller are cheap prices, quality of products, proximity to the vendor, and trust. The consumers are not aware of the different varieties. Consumers characterise high quality in terms of medium size, good colour, faultless skin, shape, taste, and they look for storable goods. Only few consider organic production or pesticide residues. For most consumers interviewed quality is more important than price, but during low supply when prices are higher some customers purchase less.

Transport is a cross-sectional issue in the VCs affecting all actors. The most important actors for transport are entrepreneurs who own trucks and lorry drivers as well as porters. They all belong to the VC supporters. The first group is mainly responsible for transport from the production areas to the markets. Farmers or intermediaries hire the means of transportation plus drivers and often accompany them. Lorry drivers are often employed seasonally.

The porter group comprises firstly handcart drivers (called Mkokoteni in Kiswahili) who are engaged in transporting the commodities from the wholesale to the retail markets or kiosks. They normally own the carts themselves or have to rent them. The second group are the carriers who load, unload, and carry the goods in the production areas and at the markets. In some cases they also perform the grading

and repacking at the market. Porters normally are not employed. They are neither specialised in a certain product nor work on contract relations. They get paid for each tour they do, with the prices depending on the type and amount of commodity they transport. Given that they do not possess a legal work permit they are sometimes double-crossed by customers who fail to pay their wages. They also harassed by officials or the police. Farmers are only involved in transport from the field to the farm (if necessary) and in some cases they arrange transport from the farm to the markets, especially to the local markets.

Carrier of onion bags at Kilombero Wholesale Market, Tanzania
(Source: SLE-Team)

An overview of the most relevant routes and means of transport can be found in annex I.

The figure below illustrates the different activities in a fresh vegetable value chain and the actors involved.

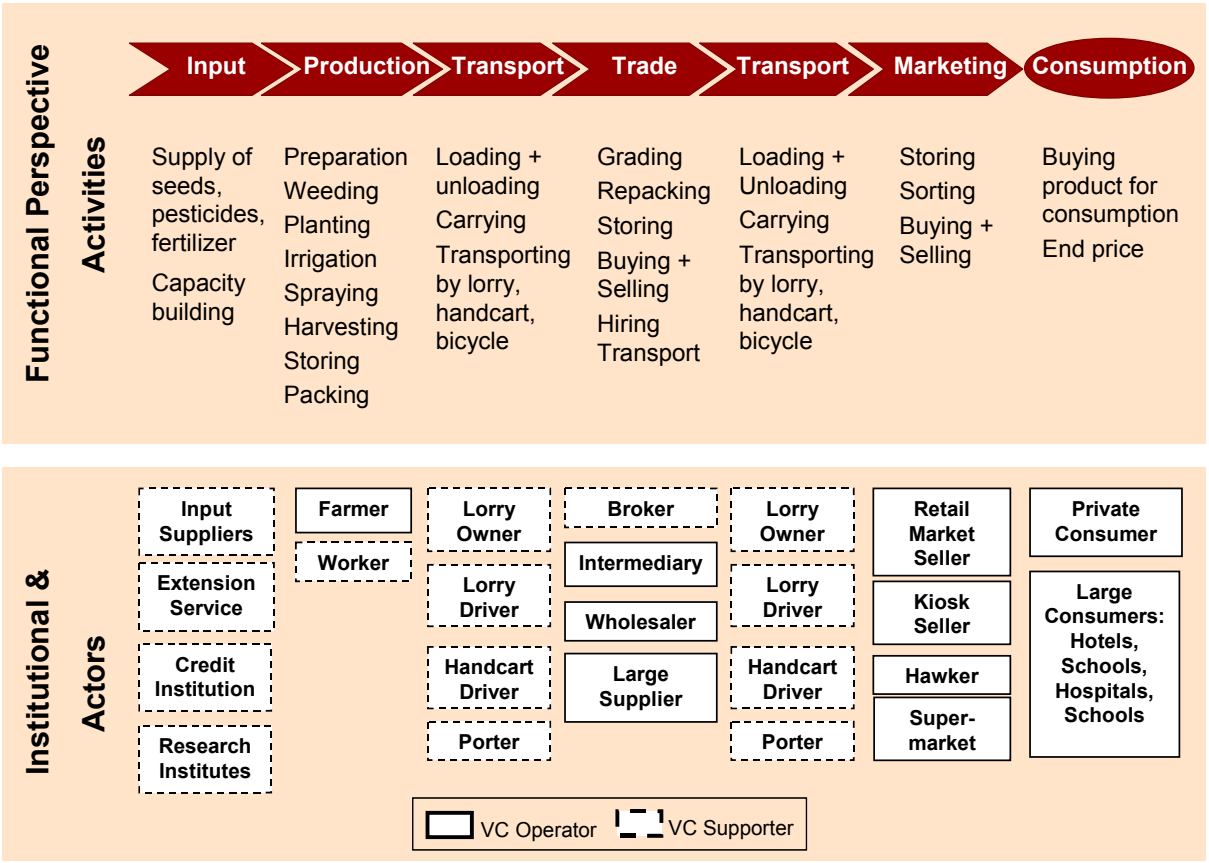


Fig. 3: Steps, Activities and Actors of all four Value Chains
(Source: Own Outline)

4.1.2 Relation of the actors

The degree of cooperation between all actors of the analysed VCs is low. They prefer to operate individually and not to rely on self-help groups or contractual business relations. At production level this is reflected in the fact that there are rarely any farmer groups in the regions. Also, for activities such as travelling to the cities to buy input supply or to sell products, the farmers rarely cooperate with one another. The few existing co-operations are based on family or friendship relations. The result is the same regarding cooperation between farmers and other actors of the VC. Contract farming is not applied in any VC analysed. In some cases farmers depend on the input supply of brokers or other “donors” and thereby undertake to sell their yield to this specific person. The price is then set by the supplier and often ranges below the market price. But normally they only grow what they can afford to and sell to whoever comes first or offers the best price. In most VCs the farmers depend on the traders for transport to the markets and the selling price is dictated by the traders.

At trade level knowledge about prices, buyers and markets is essential. But most traders (brokers, wholesalers and intermediaries) do not cooperate on a regular basis. They profit from their own knowledge or receive relevant information from

fellow traders. The relation between wholesalers and retailers as well as between retailers and consumers are spot-market ones. Especially the latter occur mostly incidentally. Regarding the power relation for buying, retailers depend more on the wholesalers who normally set the prices. Only in some instances does the retailer channel the prices he or she has to pay on the wholesale market back to the customers.

There is hardly any cooperation at retail level neither on nor outside the retail markets. Here again information is exchanged only between friends and family members. In contrast to the purchasing price, when setting the selling price most retailers are in a strong bargaining position.

The same picture of poor cooperation can be found among the transporters whether lorry owners, handcart drivers or carriers. But as lorry owners are generally in a better bargaining position, handcart drivers and carriers often depend on the goodwill of their employers.

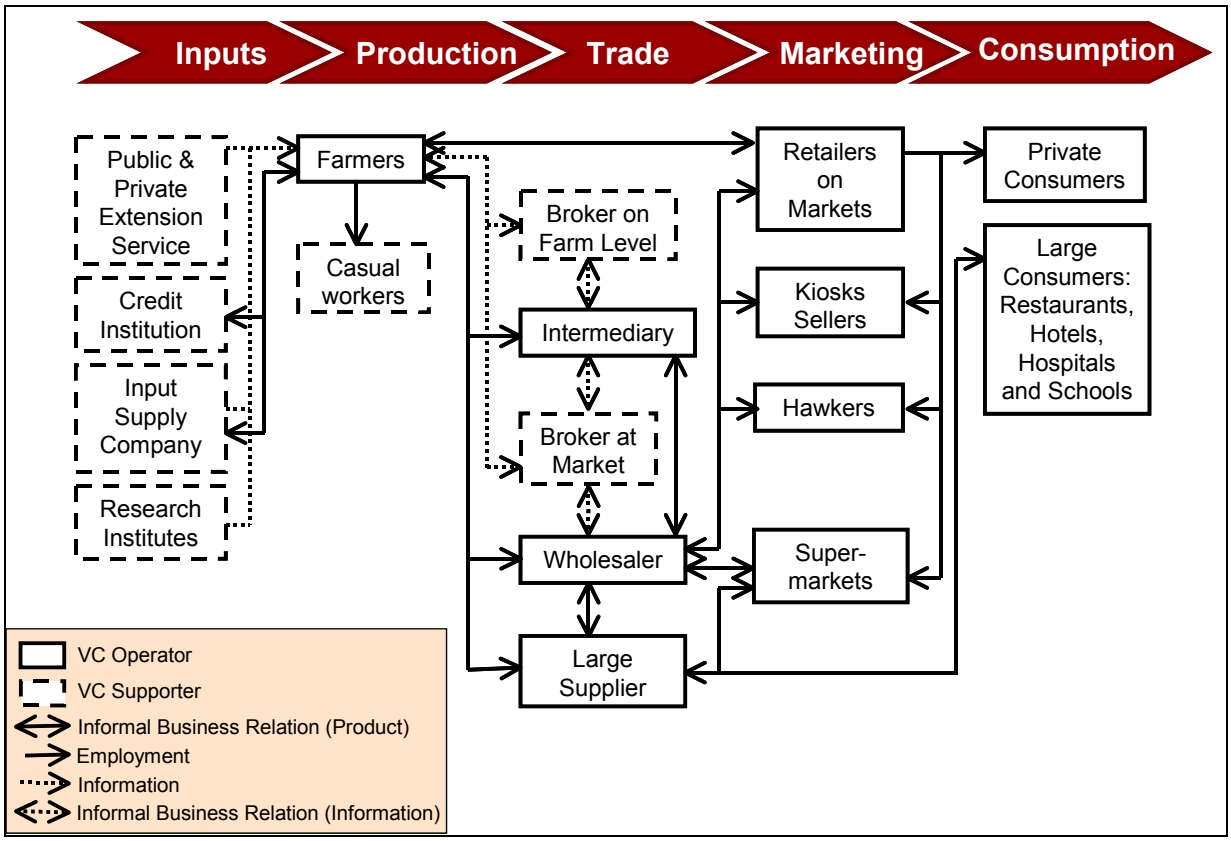


Fig. 4: Actors and their relations in all four Value Chain
(Source: Own Outline)

4.1.3 Livelihood Analysis

As described in chapter 3.2 the livelihood questionnaire describes who the poorest operators inside the value chain are. As it can be seen in fig. 5 and 6, the livelihood analysis shows that the operators interviewed rank between 37 % and 58 % of the

maximum points to be received for the four livelihood assets (for the calculation see annex IV). Their distribution is quite similar, except for the tomato VC actors in Tanzania, which is explained further in this chapter. The operators with the poorest livelihood situation are casual workers employed on a daily basis according to demand, i.e. carriers at wholesale and retail markets, farm workers as well as handcart drivers on the markets. Farmers rank in mid-table compared to all other operators, distinguished from the poorer ones by higher financial and physical assets. This is reasonable, considering the expenses and costs that tomato and onion farmers incur to run their business. Hence, they cannot be the poorest operators in the value chain. However, actors of the trade and marketing levels are notable for their superior livelihood due to higher financial and physical assets. It has to be taken into account that it was hardly possible to distinguish between real brokers and intermediaries at the urban markets, because their functions and activities overlap. So it can be concluded that brokers and intermediaries are the least poor actors in the tomato and onion value chains of Kenya and Tanzania, characterized by the highest human, financial and physical assets.

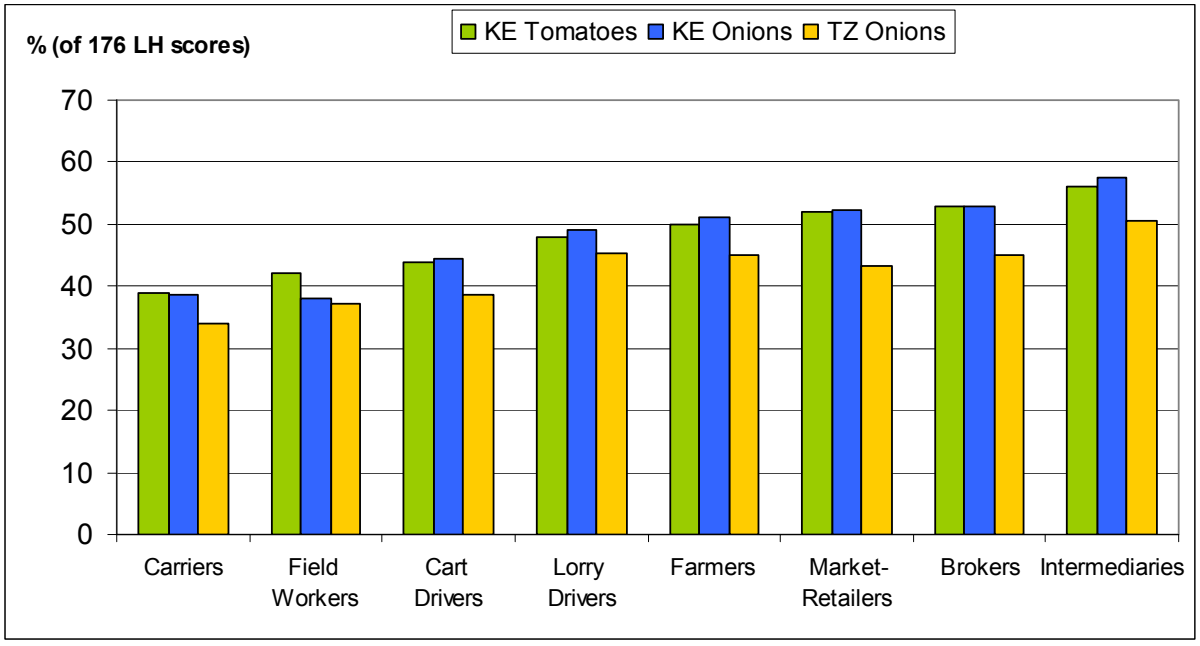


Fig. 5: Comparison of the livelihood level of important actors in the onion VC of Kenya and Tanzania as well as of the tomato VC of Kenya
(Source: Own outline)

The livelihood analysis of the actors of the tomato VC in Tanzania differs slightly from the other three. The most notable actors here are the market retailers and the carriers. The latter achieve a surprisingly high livelihood level in this VC but taking into account the qualitative data this figure is questionable. As carriers are only casual workers whose livelihood is insecure it was to be expected that their livelihood status would be lower as already established for the other VCs investigated

in this study. But it should be taken into account, that in this sample only two carriers were interviewed. These seemed not to be as poor as other carriers and the qualitative data show that they form an exception. Thus, the research team recommends ignoring this figure and to consider the carriers in this VC as also being among the poorest actors.

In contrast, for market retailers both qualitative and quantitative data indicate a relative low livelihood level. This is explained by the fact that the indicator for choosing a retailer to be interviewed was, that he or she mainly sells tomatoes or onions (over 50 % of the products they offer). It emerged that those retailers who specialise in only one or a few crops belong to the poorest actors on the markets. Therefore, the livelihood results for the retailers are very low. The less poor retailers on the retail markets in Arusha are those with large stalls and a large selection of different FFV. Tomatoes are only one among other important crops for their business. For this reason they have not been considered in the present research. The same trend but less distinctive can be noticed in the onion VC of Tanzania.

The tomato farmers achieve the highest livelihood level in this VC. In particular the farmers in one of the research regions were able to achieve particularly high profits in spring 2007 so that their already high livelihood situation has further improved. Brokers are not considered in this VC because they play a minor role.

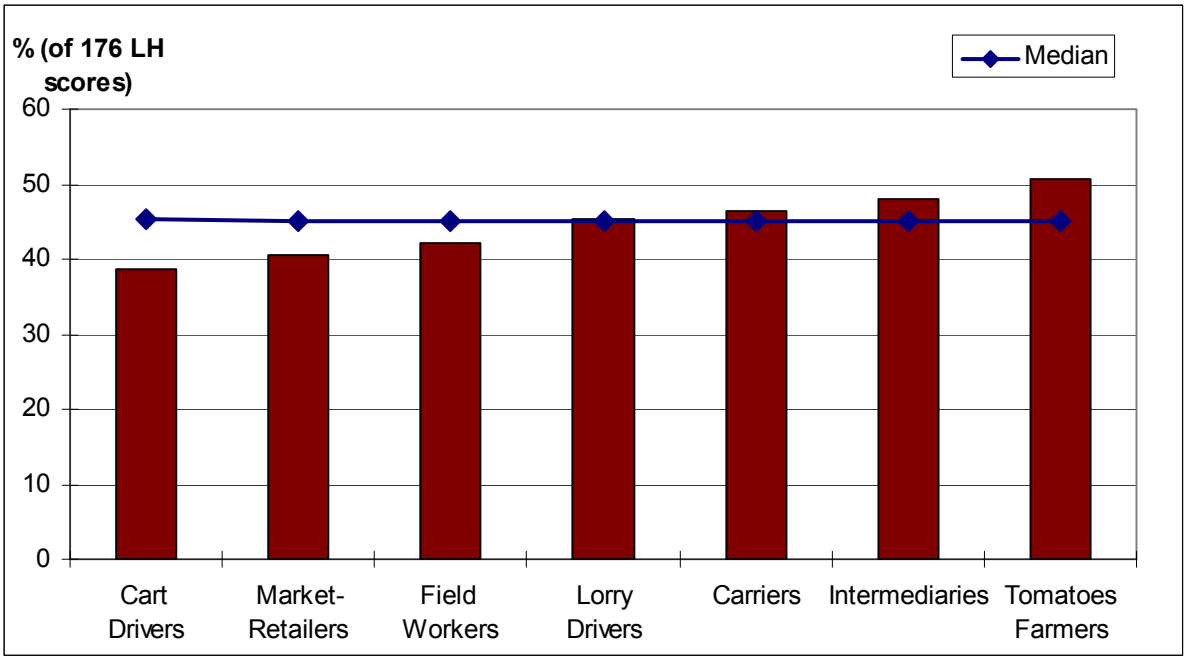


Fig. 6: Comparison of the livelihood level of important actors in the tomato VC of Tanzania

(Source: Own outline)

4.1.4 Costs, Prices, Profits and Seasonality

Since we are dealing with perishable horticultural goods, seasonality and of course high and low supply on the markets have to be considered. Seasonality is mainly influenced by the climate and weather conditions. The cultivation cycle of tomatoes is only three months long and not all tomatoes mature at the same time. Though farmers' starting point for the production cycles may vary slightly, which applies to the harvesting period as well, all actors still differentiate between high and low supply. The cultivation cycle of onions takes about six months so all onion farmers in a region start more or less at the same time with the cultivation, and respectively with the harvest. Thus, the availability of storage facilities is very important for onion producers. Those farmers (no matter if they grow onions or tomatoes) who have access to irrigation can operate more independently of the seasons.

Due to seasonality market prices for both crops fluctuate depending on the quantity and the quality of the products on the markets. Especially on the wholesale and retail markets prices also fluctuate even during one day. Often the limited availability of storage is the reason that traders and retailers try to sell all their produce by the end of one day, even if they achieve only a low price. Another reason is that most of them suffer from regular cash constraints and therefore they need the money badly. As a consequence, the highest prices mentioned in this study might only be applicable for a short period of a day or a season.

Another factor influencing the prices reviewed in the study is that record keeping and therefore production based on business planning is rare. Most of the actors just have a general overview of their expenses without knowing their exact amount of revenues required.

Taking all these aspects into account might explain why margins of costs and prices are relatively large. The applied method of handling the different steps more or less individually[11], also allow that the margins of selling prices may not match the margins of the purchasing prices of the next step. All monetary data mentioned in the following chapters has to be viewed as tendencies and not as fixed amounts.

[11] There was no focus group discussion carried out that brought together actors of different steps.

Box 1: Basic Information on Economic Calculations applied in the VCs

A general remark: the interviewees provide financial and economic information to give a general impression of their cost and revenue relation concerning their activities in the respective VCs. The economic aspect is one component of the entire VC analysis used to answer the focal points mentioned in the chapter 1. The economic information was not intended to be employed to perform a detailed business analysis at enterprise level. Hence, the following economic indicators were asked for:

- Variable costs at production level: labour costs, input expenses (seeds, fertiliser, pesticides, technology such as irrigation), transport, storage;
- Variable/ fixed costs: fees/ taxes related to the tomato and onion business, maintenance;
- Variable/ fixed costs at trade/ marketing level: rent for the selling location, market entrance fees, road fees, fuel (also for transportation) and other unspecified costs.

The questionnaires contained questions relating to paid and unpaid labour. The costs for paid labour (casual workers mainly) are part of the profit calculation. In contrast, unpaid labour is defined as family work and mutual help within the village or a neighbourhood according to the respondents. This issue plays an important role in rural areas; however, the system is far too complex to be included in this comprehensive survey.

Fees and taxes cannot be clearly classified as variable or fixed costs, both are possible.

The calculation of total costs is computed both by summarising all individual costs (own analyses) and by asking the interviewees for an estimate. This was part of the questionnaires to ascertain the actors' level of economic awareness.

The single actor's profit is calculated as follows: profit = revenue – total costs. The study team is aware of the fact that total costs take into account the variable costs related to the products and not all fixed costs an enterprise has to pay. This simplification is justified, because most of the actors interviewed operate in the informal sector. The profit calculation is carried out for both, per kg and including the volume of sold product.

Share of profit: To identify each actor's share of profit, the following calculation is used:

Example	Profit in USD per kg	Share of profit in %
Actor 1	0.13	30%
Actor 2	0.20	45%
Actor 3	0.11	25%
...		
Total profit of all actors	0,44	100%

In order to use aggregated data the median is used in the tables. Since the sample size is limited the median is more suitable than the average because extreme low/high figures are not considered.

4.1.5 Standards

There are two aspects to consider as far as standards are concerned: First, legal regulations, and standards in particular, do exist but the actors along the chains are not aware of those standards. Second, there is also no demand reported for these standards, neither from the producers nor from the consumers.

At production level farmers producing for the domestic market did not have any information about maximum pesticide residue levels, nor had the extension service. For instance, printed or electronic copies of the regulations were not available even at the ministry but only at the Kenyan Bureau of Standards where they are for sale. Taking such an "information policy" into account it is not surprising that neither actors of the chain (especially farmers, workers and retailers) nor MoA field personnel (i.e. extensionists) were aware of the existence of any standards for their commodities.

With regard to the findings of the study, standards in Kenya and Tanzania in general can be classified into four groups: 1. relating to packaging and measures for selling the produce, 2. relating to health and sanitary issues other than chemical residues, 3. relating to the use of chemicals in pre- and post harvest and their residues, 4.relating to seeds and chemicals set for the manufacturing industry.

Ad 1: Measurements for traded vegetables are not regulated by the state, but on the markets a certain size of tomato crate or onion bag has been established. It must be emphasised that the units applied differ from region to region. Weighing scales or other measurement instruments do not appear to be used by any of the actors.

Ad 2: At the production level, the use of protective clothing especially for the sprayers in the fields is rare. Hygienic conditions at markets were rather poor.

Ad 3: As mentioned above, farmers, traders, retailers and consumers are not aware of the issue of chemical residues. The market for organic products has only just been established and seems to be an issue mainly for foreigners.

Ad 4: Seed breeding and producing/selling of agro-chemicals is regulated in the countries, but differently. As a consequence, farmers in both countries face different input prices.

4.2 Mapping Tanzania

4.2.1 Research areas: Production regions and markets in Tanzania

The research areas in Tanzania are all located in the Arusha region in the Northern part of Tanzania. This region has a population of 1.3 Mio. Regarding the poverty profile there is on the one hand a relative high percentage of people living below the food poverty line (25 %, national average: 18.7 %). On the other hand the percentage of people living below the basic need poverty line is almost average (39 %, national average: 35.7 %) (NBS 2002).

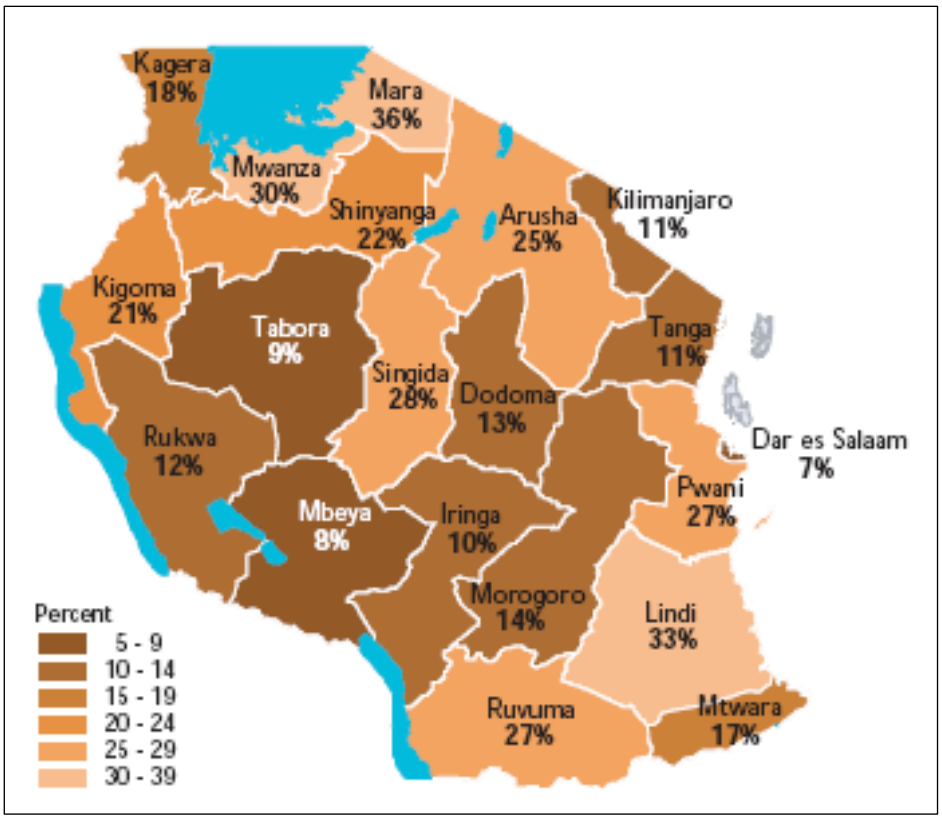


Fig. 7: Percentage of the population below the food poverty line
(Source: NBS 2002, pp. 72)

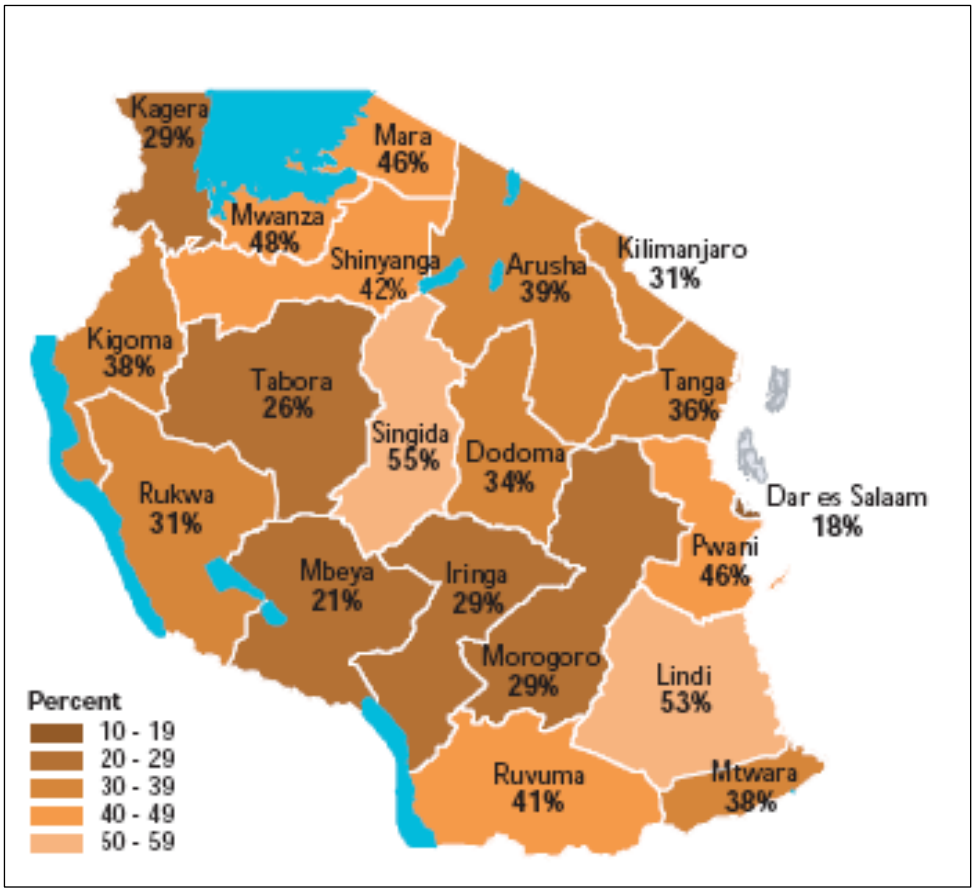


Fig. 8: percentages of the population below the basic needs poverty line
(Source: NBS 2002, pp. 72)

The production research areas concentrate on two of five Arusha Region's districts, which are Arumeru[12] for tomatoes and Karatu for onions.

Regions researched for tomatoes

Arumeru district covers an area of almost 3,000km². Of these 151,000ha are under I cultivation, 45,500ha under irrigation. Although most of the population are small-scale farmers, the production area they cover is only 17,500ha. The average farm size is 1.2ha (acc. district council). The diverse climate enables the farmers to cultivate a wide range of products. An extensionist reported that besides tomatoes they also grow onions, beans, maize, cabbage and sweet pepper as cash crops. In the short season some of them supplement their revenue with livestock such as cattle, goat or sheep.

[12] Arumeru District is now divided into two districts, Arusha and Meru. But as the process was not finished during the research period this report still refers on the "old" Arumeru district area.

The total population of the district is 516,814 of which 51 % are female. The district is divided into 6 sub-divisions, 37 wards, 144 villages and 557 sub-villages. The study focuses on the wards of Nduruma and Ngari Nanyuki.

Region researched for onions

The main research areas for the Production and Input level for the VC analysis of onions in Tanzania concentrated on the Barai and Mang'ola wards in Karatu District. Karatu is located in the west of the Arusha region. It is administratively divided into 4 divisions, 18 wards and 45 villages. The estimated area of the district is 3300 km². Arable land accounts for 102,573 ha. The total human population is 209,316 (108,844 men and 100,472 female). 80 % of the population depends on agriculture and livestock keeping. The population growth rate is 3.1 % per year. In Karatu District highland, midland and lowland agro-ecological zones are to be found. Onion cultivation takes place in lowland areas, where rainfall is around 300 mm or less. Major economic activities are crop and livestock production. Onions are considered to be one of the major cash crops. They are mainly cultivated around Lake Eyasi in the Barai and Mang'ola wards (Njumbo 2007).

Markets researched

In Tanzania the study examined markets in Arusha, particularly Kilombero Wholesale Market and the two retail markets of the city, Kilombero Retail Market and Arusha Central Market.

On the **Kilombero Wholesale Market** a variety of crops are traded such as vegetables, fruits, grains and rice. Representatives of the market authority disclosed that the market was reorganized last year from a public owned wet market to a privately organized market place with cement floor and corrugated iron roof. Only the land belongs to the Arusha Municipality Council. In 1999 traders founded the SACCOS Trader Association with approximately 100 members to manage the market. This organisation is in charge of regulating market access and of collecting the market fees depending on the amount each trader sells. In return the municipality is responsible for cleaning, security and carrying out small repairs. The traders of each crop department meet every 3 months to discuss important issues and to elect one representative for each department. The association is about to introduce registration cards to monitor the traders on the market. Until now they have only used a registration book, but they are not sure if all traders dealing on the market are registered. Since the association is open to both wholesaler and farmer, the latter theoretically have access to the market as long as they are registered but some actors reported that in practise no farmers are involved in the trade on the market.

The major problems the traders currently face are security issues, e.g. the lack of security lights at night, and the limited space. The onion section in particular is overcrowded. Thus, the market authority wants to establish a new rule, allowing only five onion trucks per day to enter the market.

On the **Kilombero and Arusha central retail markets** a variety of food crops, animals as well as household goods and hardware are offered for sale. As confirmed by market officials both retail markets belong to the Arusha Municipality Council. The Council manages the markets with its own staff, partly based in the municipality building, partly working on the markets. Market fee collection is outsourced to the private company, *H. R. Soods & Sons*. The daily fees depend on the market's location as well as on the kind of stall and vary from 200 to 6'000 TSH (0.15-4.6 USD). This payment is fixed and does not take into account the amount of produce sold. In return the municipality provides a daily cleaning service, collects the waste at the end of the day, and provides a round the clock security service. . Because of this service some sellers use the market to store their unsold produce.

The Arusha Central Market is located in the old centre of the city. It can be roughly divided into three different sections: 1. the market hall with a corrugated iron roof and cement floor, 2. another covered zone mostly consisting of narrow alleys lined with smaller and bigger wooden stalls and single stone stores and 3. the uncovered area directly in front of the market gates where cart handlers and small-scale marketers are located. On the market place there is a café and a restaurant. Also access to water and toilets is available.

The Kilombero Retail Market is located next to the wholesale market. The infrastructure of the retail market is much worse compared with the Arusha Central Market or the wholesale market, even if it is as big as the central market. It has three different sections. 1. There is one building on the market with a small office for the Arusha Market Council. But because of renovation work there are only a few stalls inside. 2. Other covered parts of the market have permanent stalls but the ground is not solid. 3. The uncovered area of the market is partly inside the market place and partly behind the market gate. The floor is not only not solid but also very uneven. It is also full of puddles outside the rainy season because the retailers wash their produce in front of their stalls.

Space on both markets is very limited, thus access to the market for newcomers is problematic. Some of the resource persons described the markets as a "closed shop". Consequently the retailers adapt their offer depending on seasonality to keep their place and to continue with their business.

The Arusha Municipality could not provide statistical data concerning the volume of both retail markets. One resource person estimates that more than 200 retailers sell

tomatoes and onions. On average they daily sell together 20 bags of onions respectively 20 crates of tomatoes, but the volume differs according to the season.

With regard to the retailers it has to be said that they know each other very well. Only very few of them use weighing scales. The majority estimate the exact weight by counting or using buckets.

Kilombero Wholesale Market, Tanzania
(Source: SLE-Team)

Arusha Central Market, Tanzania
(Source: SLE-Team)

4.2.2 Tomatoes in Tanzania

Tomato is an important horticultural product in Tanzania both for home consumption and as a cash crop. From 1990 to 2004 the area under cultivation increased (from 14 to 19 '000ha) as well as the yield (from 7.5 to 7.6 t/ha). Main production areas can be found in the Northern Region particularly in Arusha, Kilimanjaro and Tanga, in the regions of Morogoro, Iringa, Dodoma, Mwanza, and Mbeya, as well as in coast regions (Lyimo 2006:12).

4.2.2.1 Actors, Activities and Relations within the Value Chain

Input level

Tomato producers require inputs such as seeds, fertilisers, pesticides, and machines (e.g. spraying pump). All of these are offered on the private market. Farmers buy seeds, fertilisers and pesticides at the local stockist. They mainly hire the machines

from private owners even though some are communally owned. Additionally, some brokers offer **input supply** on a credit basis to the farmers. The farmers then have to sell their yield to the broker at the price the broker dictates. That is why farmers try to avoid these types of relations (see also below trade level).

The tomato **varieties** the farmers mainly cultivate are Cal J, Onex, Marglobe and Money Maker, but also 44-2, 50-2, and 19-2. The new varieties promoted by AVRDC (Tengeru 97 and Tanya) are not so common among the respondents of the study. A reason for this might be the high costs. In general farmers prefer to breed the seeds themselves to reduce costs. The quality of this seed is reported to be as good as or even better than the purchased seed. One problem regarding the hybrid varieties is the prevalence of fake seed.

Tanzania possesses a relatively well organized public **extension service**. This service is coordinated at district level but also evidences extensive presence at village level. In addition there are quite a number of private NGOs active in the region offering a variety of support or consulting services to the farmers.

Production level

In the Arusha region there is normally one major **production season** for tomatoes from February/March to May/June; the risk of diseases and decay due to rainfall is low (= high season). In a second season from September to December (= low season) not all tomato farmer grow tomatoes because of unstable weather conditions. Some farmers claim to be able to plant a third season. Normally the farmers use furrow irrigation; that means the furrows in the plot are filled with water from the river. Most farmers reported that they do not have problems with irrigation in the rainy season, but in the dry season there are some areas that suffer shortages of water.

Table 4: Seasonal Calendar of tomato production in Arusha District

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Dry Season		Long Rain			Dry Season					Short Rain	
	Planting			Harvesting				Planting			Harvesting
		1st season					2nd season				

(Source: Own outline)

Most tomato growers in the region are small- to medium-scale farmers. The small-scale farmers of our respondents have a **farm size** of 1.25 to 4 acres (median: 3

acres) from which they use 0.25 to 1.25 acres (median: 1 acre) for the cultivation of tomatoes. The farm sizes of the medium-scale farmers from our sample range from 5 to 22 acres (median: 15 acres) with 3 to 8 acres (median: 7 acres) under cultivation of tomatoes. The classification of farm size is based on the respondents' own perception.

Tomatoes are mostly grown as a cash crop. Based on the quantitative data a median of 87 % of total **yield** is sold to market and only 1 % is used for private consumption. Due to the sensitivity of tomatoes post harvest losses at farm level are relatively high (12 %) and greatly depend on the weather conditions. The data obtained for the average yield of tomatoes per hectare varies greatly. The medians from the quantitative data indicate in the main season a yield of 15t/ha and in the low season a yield of 14t/ha.

In spite of the high costs an intensive use of **fertilisers and pesticides** is common. But a growing consciousness of the negative effects, especially regarding health problems, is reported. Farmers mentioned that CABI Africa, Regional Center ICRAF, based in Nairobi, takes regular blood tests in Ngari Nanyuki in order to learn more about the actual situation of pesticide residues and to raise people's awareness. Both the agricultural extension service of the district and the NGOs operating in the region focus on training schemes to reduce the use of chemicals. But Integrate Pest Management (IPM) or organic production are still not so well known. Especially in tomato production the fear of pest and diseases is very high.

The farmers in the region are only slightly used to any form of **cooperation**. This bottleneck in the value chain is recognized by most NGOs working in this field. Many of them promote and support the establishment of co-operations amongst the farmers (e.g. FAIDA MaLi). It is common for farmers to employ **casual workers** in times of heavy work loads. Typical activities of the workers are soil preparation, stocking, weeding, harvesting, and scaring bats.

Normally the farmers sort the tomatoes into two to three grades according to the size and the physical appearance of the fruits. Other **standards** such as pesticide residue or production conditions are not taken into consideration. If the produce is sold at the farm gate the traders grade the produce before buying. But if the farmers go to the market themselves they grade before selling.

There are no cooling or **storages facilities** in the region, so tomatoes are harvested at an unripe stage to simplify storage. For the same reason farmers prefer varieties that keep longer after harvesting such as CAL J. On average tomatoes keep for 3 weeks. As tomatoes are mainly harvested directly prior to selling, transport from the field to the farm house is not a critical issue.

Ngari Nanyuki in particular is well known for its high quality tomatoes. The farmers in this area are well organized and often manage transporting the produce from the field to the markets themselves. They trade most of their produce on the market in Arusha but also in Dar Es Salaam, Tanga or Mombasa.

The produce from Nduruma mostly goes to supplying the Kilombero wholesale market in Arusha or the local market in Tengeru, near Arusha. In Nduruma it is more common to sell the produce at the farm gate. Then the **traders** have to organize the transport of the products. Some traders who come to the farm gates are retailers buying small amounts or lower quality produce to sell at the small local markets.

In the research areas the respondents reported sufficient **transport** alternatives. Especially in Ngari Nanyuki, where the farmers have been able to achieve very good prices in the last few years, many farmers had bought their own means of transport such as small trucks or mini-buses. Nduruma is located relatively close to Arusha, therefore the connection to Arusha by public transport is good. Beside the farmers there are some bigger transport companies operating in the region.

In both wards the farmers **communicate** with the traders before entering into business. The use of mobiles is quite common and facilitates the market access of the farmers. They set up contacts to buyers in the markets of Arusha, but also Dar Es Salaam, Tanga and Mombasa, whom they call to check their demand before going there. They also exchange their contacts with friends. Some of these contacts were reported as quite frequent, although there are no formal contract relations between farmers and buyers in place. It was reported that some farmers try to assess demand before planting, but this is not common.

Tomato farmers in Nduruma, Tanzania
(Source: SLE-Team)

Trade level

The findings of the study indicate that most **traders** in the tomato value chain in Tanzania are wholesalers who simultaneously act as intermediaries and brokers. They are normally specialized in one product and operate mostly individually. They mostly purchase the produce from the farmers coming to the markets but they also go to the farms to buy. Brokers or intermediaries are relevant for those farmers who face difficulties in getting to the markets. Circumstances that hinder them are poor infrastructure, especially roads in the rainy season, and little access to information on the market. Also lack of storage facilities for tomatoes render intermediaries essential for the farmers.

The intermediaries **grade** the produce on the farm and select only the 1. to 2. grades. The farmers sell the rest of the produce themselves to local markets or to small retailers who come to the farm gate. On the wholesale market the traders grade the tomatoes again in 2 or 3 grades according the size and appearance of the fruits.

The **Arusha Kilombero Market** is the main wholesale market in the region. There are 104 registered intermediaries for tomatoes. Most of them operate as wholesalers buying tomatoes from the farmers and selling them to retailers. A representative of the tomato section reported that some of them (around 10 %) take advantage of those wholesalers who are not able to sell their produce in time. They buy the tomatoes from them at a low price and sell them to other intermediaries on the market.

The main **unit** of measure for buying and selling are wooden crates that hold 30-40kg. There is no exact weight used for the crates, so the information provided by the respondents deviates slightly. These crates were implemented in the 1990s by two NGOs (FAIDA MaLi and SNV) to stem the high **losses** during transportation. They are very well adapted, although sometimes they are packed so tightly that high losses might still occur. But even bearing in mind that the only storage facilities the wholesalers possess is above the roof on the wholesale market, they reported only small losses (in high season 2%).

The **varieties** sold on the market are Onex (75 %), Tanya (15 %) and Marglobe (10 %). Demand for the latter is reported to be decreasing. One third of each variety is sold to retailers in Arusha as well as to intermediaries from Dar Es Salaam and Mombasa. There is no register for the amount of tomatoes traded through the Kilombero wholesale market but an official estimates that all traders together sell around 700 crates in high season and 300 crates in low season.

Cooperation particularly among the tomato intermediaries of the wholesale market is relatively high. They meet approximately every month to discuss any problems they might have or with the municipality. Around 51 of the 104 tomato intermediaries are

planning to form a savings group (SACCOS, for a definition see box 2). They collect 100 TSH (0.08 USD) for each crate and save it in a common bank account. Nevertheless, they do not cooperate in their everyday business such as in purchasing tomatoes or exchanging market information. One of the most compelling statements came from these operators, saying “Everybody is looking out for his own profit”.

Box 2: SACCOS

A well functioning financial sector is crucial to developing a country’s economy. However, the majority of Kenya’s and Tanzania’s population has very limited access to the formal financial sector due to high costs. Savings and Credit Cooperative Societies (SACCOS) are perceived as semi-formal finance institutions supported by both countries’ governments since the early ´90s. Official registration, implementation of a board with democratically elected members, a general assembly once a year, and account books that can be properly audited by the authorities are compulsory components of that society. A SACCOS is open to employers and employees and furthermore to all sectors in urban and rural areas.

The Tanzanian Cooperative Societies Rules, newly adopted in 2004, set out what members can receive in return:

- ”preferential treatment in relation to services, prices, dividends, competitive interests, employment and tax relief; and
- accessibility to Government and Non-Governmental organizations’ support.” (Paragraph 20, a, b)

The members agree to save money jointly so that the entire group can benefit from each person’s “small money”. The second target is to have access to credits for reasonable interest rates. Very often SACCOS cooperate with banks in order to store the deposits and to apply for loans. In both countries some banks specialise in serving SACCOS: Co-Operative Bank of Kenya and in Tanzania for instance the National Microfinance Bank and the Cooperatives Rural and Development Bank. Those banks are able to offer lower interest rates than for individual customers due to public subsidies.

Currently 5,000 SACCOS are registered in Kenya and more than 160 operate as banks. In Tanzania 620 SACCOS operate across the country covering a large variety of sectors such as farmers, teachers or taxi drivers.

Marketing level

Consumers normally buy fresh fruits and vegetables (FFV) at the retail markets or kiosks. In addition, the only large supermarket in Arusha possesses a FFV department but it is very small and the customers are generally expatriates living in the city or tourists. As an estimate more or less half of all FFV in the Arusha region are sold on the two retail markets. The other half is distributed between local markets, kiosks, and hawkers. Only a very small amount (less than 1 %) is sold in the supermarket.

The **amount** the respondents sell daily on the retail markets varies from 5-15kg in high supply and from 9-20kg in low supply. An explanation as to why they sell more in low supply might be that fewer sellers are active.

Vendors at kiosks seldom sell more than 4-5 kg of tomatoes a day. Hawkers normally offer only 1-2kg of tomatoes for sale, carried in a small basket or cloths, others have a bigger range on offer. Hawkers are mostly female whilst kiosk owners or retailers on the markets can be male or female.

Most of the retailers in Arusha **purchase** their tomatoes in crates at the Kilombero Wholesale Market. Sometimes they also go to the farms nearby themselves or buy from othes retailers on the retail market. Almost all retailers sort the tomatoes into small groups of 3-6 tomatoes prior to selling and sell them at a specific price. Sometimes they also sell the tomatoes in buckets or small baskets.

4.2.2.2 Profit Margins along the Value Chain

Production Level

According to the respondents' answers the average costs incurred by the tomato producers are 0.14 USD in high season and 0.10 USD in low season per kg of tomatoes. Costs for fertiliser and pesticides make up a significant share of the total input costs.

Labour costs are also expensive for the farmer. An average casual worker earns 1.10 to 1'500-2'500 TSH (1.92 USD) each day. This does not include any form of social insurance.

The sales price of tomatoes fluctuates greatly. It depends on the season, the climate and ultimately the overall yield in the region, as well as demand. For example, in Arusha demand for fresh fruits and vegetables is much higher in the tourist season because of increased demand from hotels and restaurants. The following table shows median selling prices in high and low seasons:

Table 5: Selling prices, cost and profits for tomato farmers in high and low season per kg (in USD)

Figures for Production Level per kg (in USD)		High Season	Low Season
Selling prices	Variation	0.01 - 0.23	0.27 - 0.71
	Median	0.13	0.50
Costs (Median)		0.14	0.10
Profit (Median)		- 0.01	0.40

(Source: Own Compilation)

These figures illustrate that the farmers make a loss in the high season (-0.01 USD) whereby in the low season they can realize a high profit (0.40 USD). One must also take into consideration that tomato cultivation in the low season is very risky due to unstable weather conditions. Consequently, only a few farmers take the risk and cultivate tomatoes in this season. Others cultivate less delicate crops or switch to livestock husbandry.

Trade Level

The list of costs, prices and profits focuses on sellers on the Kilombero Wholesale Market. As they are essentially for farmers and retailers their bargaining position is relatively high. This circumstance is reflected in the fact that the wholesalers gain the highest profit of the VC taking account the amounts handled (see fig. 10, 11). Beside the bargaining position low costs also impact on the wholesalers' profit. The costs includes paid labour, particularly casuals who carry and grade the commodities, markets fees and transport if they buy directly from the farm gates. More detailed information can be found in the table below.

Table 6: Buying and selling prices, costs and profits for tomato wholesalers in high and low season per kg (in USD)

Figures for Trade Level per kg (in USD)		High Season	Low Season
Buying prices	Variation	0.05 - 0.13	0.29 - 0.33
	Median	0.09	0.30
Selling prices	Variation	0.12 - 0.21	0.37 - 0.87
	Median	0.18	0.45
Costs (Median)		0.04	0.14
Profit (Median)		0.06	0.01

(Source: Own Compilation)

An important fact to note here is that the wholesalers, in contrast to all other actors in the VC, benefit more in the high season than in the low season. This is due to the fact that in low season the services provided by the wholesalers as well as by other intermediaries and brokers are required less frequently. As the amount of product on the market is low, sellers and buyers can easily team up without the help of a third party.

Marketing Level

As indicated in the livelihood analysis (see chapter 4.1.3) retailers belong to the poorest actors in the VC. Therefore it might come as a surprise to discover that the profit they make is almost equal to (high season) or even higher (low season) than that of the wholesalers. It should be taken into consideration that the profit shown in the tables does not include the amount of produce the actors trade. Taking that into consideration, figures 10 and 11 demonstrate that the share of profit for the retailers is almost zero.

Apart from the wholesale price retailers are also faced with other costs mainly to finance transport to their location and payment of market fees. Hence their costs are relatively low.

Table 7: Buying and selling prices, costs and profits for tomato retailers in high and low season per kg (in USD)

Figures on Marketing Level per kg (in USD)		High Season	Low Season
Buying prices	Variation	0.10 – 0.32	0.27 – 0.77
	Median	0.22	0.68
Selling prices	Variation	0.24 – 0.62	0.51 – 1.00
	Median	0.29	0.82
Costs (Median)		0.02	0.03
Profit (Median)		**0.05**	**0.11**

(Source: Own Compilation)

Transport

The actors at transport level are very heterogeneous therefore it is too complex to depict a detailed picture of all their costs and prices here. The following explanation includes short distance transport handcart drivers and carriers as well as some figures for long distance transportation.

Handcart drivers, especially if they own the handcart, have relatively low operating costs. What they fear most is damage to their vehicles and fines by the police. The high competition among handcart drivers regulates the prices they can achieve for

their service. Furthermore, they face a high risk of being involved in an accident. Their revenue depends on how many tours they can accomplish in a day. Most of them reported that they achieve an average of 2-3 tours per day.

Table 8: Costs and Payments for Handcart Drivers

Costs and Payments for Handcart Drivers (in USD)	High Season / Low Season
Tour from Kilombero Wholesale Market to Arusha Central Market with Onion Bags	0.77
Tour from Kilombero Wholesale Market to Arusha Central Market with Tomato Crates	0.38
Costs for renting a cart	0.23
Ø Profit/Day	1.92

(Source: Own Compilation)

Carriers have no special costs to cover. They only need their own manpower for their work. But their payment is low and irregular. Normally they get 100 TSH (0.08 USD) per rate they carry. Average daily revenue is about 1 USD.

The costs for long distance transportation by trucks or pick-ups are very difficult to calculate. They depend among others on variables such as whether the person transporting owns the mean of transportation or not and on the wage. A farmer in Ngari Nanyuki who owns a small 4 ton truck explained that he charges about 600'000 TSH (460 USD; 2.3 USD/crate) to go to Dar Es Salaam and about 700'000 TSH (540 USD; 2.7 USD/crate) to go to Mombasa. This covers his costs for fuel, road fees and in the case of a border crossing the costs for this.

Consumption

For the consumers there are no costs to be considered such as travelling to the market etc. They have only been asked to state the average price they pay on the market. The result can be seen in the table below.

Table 9: Final Purchase Prices for Consumers

Figures on Consumer Level per kg (in USD)		High Season	Low Season
Buying prices	Variation	0.09 – 0.31	0.15 – 0.46
	Median	0.15	0.46

(Source: Own Compilation)

Conclusion

To conclude, it can be calculated that the farmers achieve a negative profit in high season. But in low season they make the highest profit of all the actors in the VC. This picture alters if the volumes are considered as well. In this situation the traders claim the highest share of profit for themselves. The share of profit of the retailers in contrast is almost cero. This corresponds with the results of the livelihood analysis.

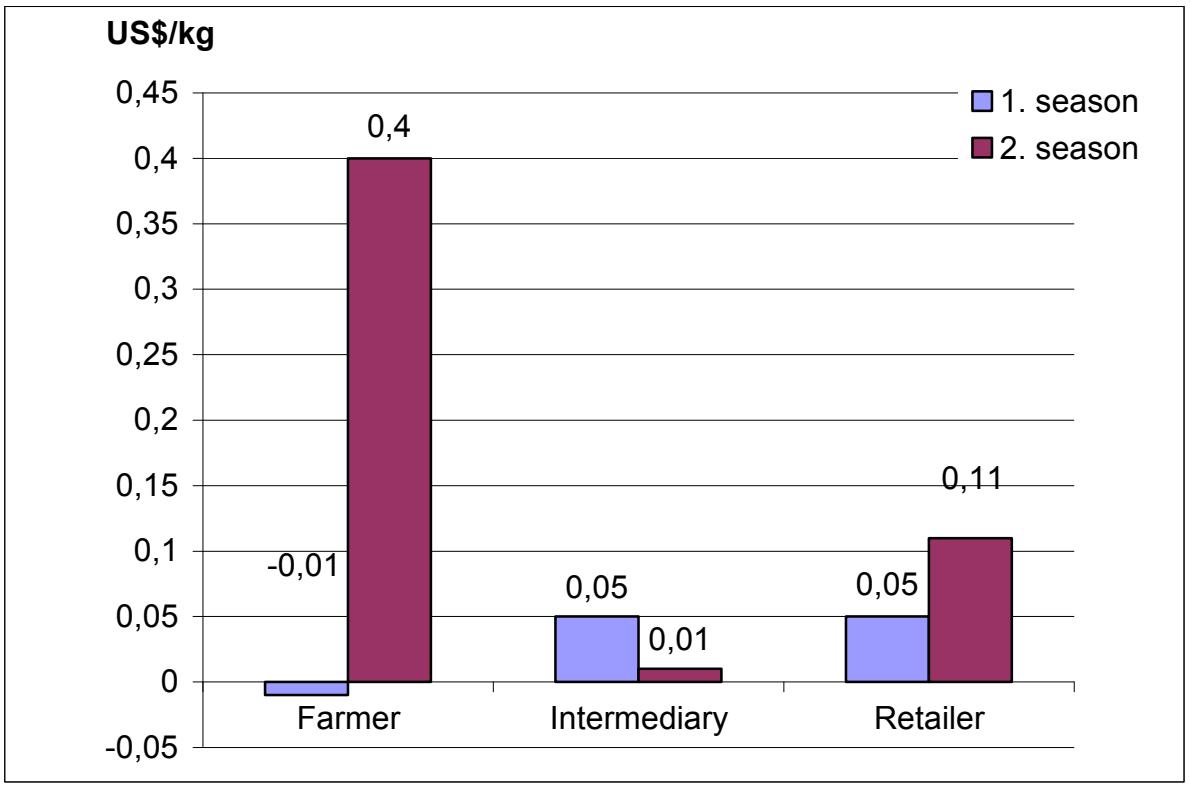


Fig. 9: Profit per kg in USD for actors in the tomato VC of Tanzania
(Source: Own Compilation)

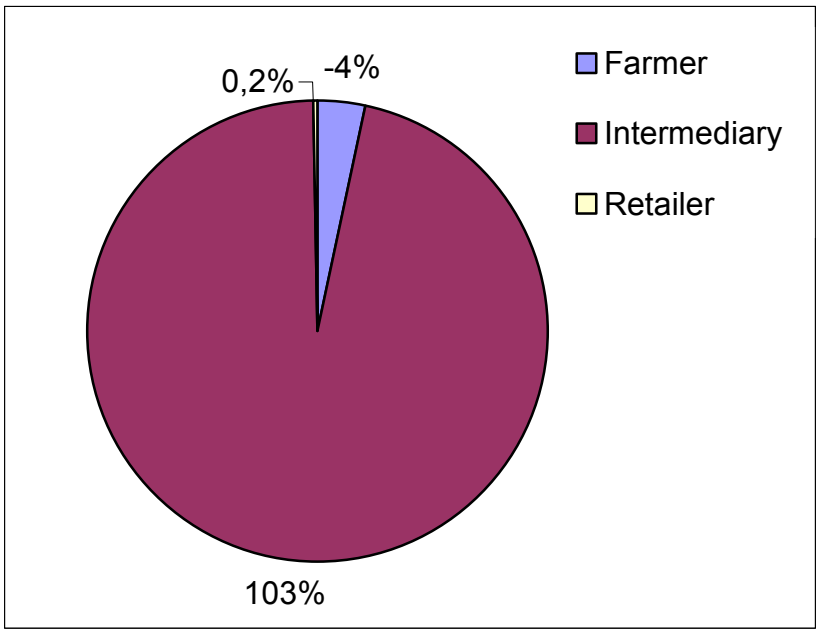


Fig. 10: Profit share in 1. Season considering the amounts
(Source: Own Compilation)

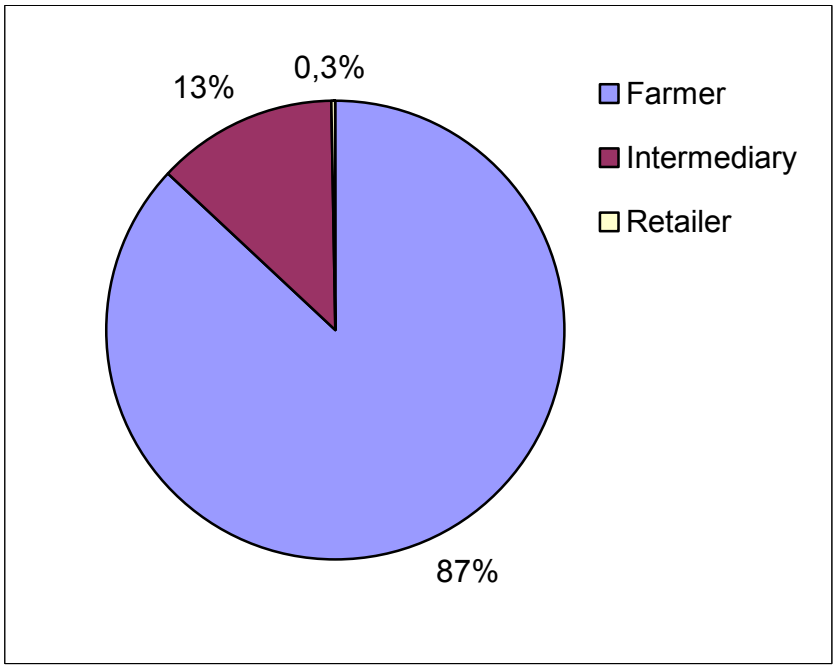


Fig. 11: Profit share in 2. Season considering the amounts
(Source: Own Compilation)

4.2.3 Onions in Tanzania

Researched region for onions

The main research areas for the the onion VC production and input levels in Tanzania concentrated on the Barai and Mang'ola wards in Karatu District. Karatu is located in the west of the Arusha region. It is administratively divided into 4 divisions, 18 wards and 45 villages. The estimated area of the district is 3300 km². Arable land accounts for 102,573 ha. The total population is 209,316 (108,844 male and 100,472 female). 80% of the population depends on agriculture and livestock keeping. The population growth rate is 3.1% per year.

In Karatu District highland, midland and lowland agro-ecological zones are found. The climate varies across the district. It has bimodal rains, shortrain between October and Decemer in the highlands and long rain (Masika) between March and June. Onion cultivation takes place in lowland areas, where rainfall is around 300 mm or less.

Major economic activities are crop and livestock production. Onions are considered to be one of the major cash crops. They are mainly cultivated around Lake Eyasi in the Barai and Mang'ola wards (Njumbo 2007).

Onion field in Karatu, Tanzania
(Source:SLE-Team)

4.2.3.1 Actors, Activities and Relations in the Value Chain

Input Level

With the liberalization of the economy in 1994 the Tanzanian seed industry was also reformed. This simplified the seed production structure, gave more rights to research stations, private companies and individual farmers and thus reduced costs. The

current system is more competitive and dynamic than the Kenyan seed industry (Muendo et al. 2004c). A key innovation is that the Tanzanian law allows and encourages seed to be produced at village level under what is termed Quality Declared Seed (QDS). This approach of Community Based Seed Production (CBSP) has resulted in lower prices to farmers for horticultural seeds, greater availability, and in at least one case (Mang'ola Red onion variety), development of a variety that has substantially improved Tanzanian competitiveness in regional markets (ibid). The onion variety cultivated most in Tanzania is Red Bombay. In Karatu District it is Mang'ola Red, an onion variety developed by farmers who were trained to produce quality onion seeds for themselves and for companies. This seed is of good quality (higher yields and longer storage period) and at the same time relatively cheap. Seed costs therefore are lower compared to Kenya (see chapter 4.3.3.2, Muendo et al. 2004c).

Though Mang'ola and Barai Division offer good production conditions for onions, farmers still have to struggle with pests and diseases which reduce and spoil the yield. To avoid this they apply high amounts of **chemical pesticides**. Buying fertilizer and pesticides thus requires high investments on the part of the farmer. Only **agricultural extensionists** at division or district level, who support farmers in terms of capacity building are aware of alternative methods for protecting against disease and reducing pesticide costs such as Integrated Pest Management (IPM) or applying organic pesticides. However, farmers remain skeptical of the effectiveness of these methods. They fear even higher costs. Extension services also give farmers assistance to establish farmers groups and societies to improve market access.

Production Level

The area planted with onions in Mang'ola and Barai division onions continues to expand because onions from Karatu District are known for their good quality and thus command high prices at the markets. Even farmers who live in other regions come to Mang'ola or Barai to cultivate onions there. The majority of the producers are small and middle scale farmers who own 0.25 to 3 acres. Only a few farmers possess more than 3 acres. Land owned by large scale farmers or communal land is usually rented to small scale farmers who cultivate for them. Farm sizes are quoted according to the farmers' perception and statements of agricultural extension officers are shown in table 10.

Table 10: Onion farm sizes in Mang'ola and Barai division (Karatu District); perception of producers.

Farm size	Acres
Small scale	0.25 – 1
Middle scale	1.5 – 5
Large scale	> 5

(Source: own outline)

The **cultivation period** of onions takes three months after sowing of the seedlings. Usually farmers are able to harvest twice a year. The Mang'ola area has only one rainy season, from March to June, and receives less than 500mm. During rainy season onions are hardly produced, because humidity increases the risk of diseases and pests. During this period farmers switch to other crops better adapted to this climate, e.g. maize. The main onion planting season is the dry period from July to October and from December to March. Most of the onions planted in July to September are stored after harvest and sold up to end of April when the onions planted in December/January are harvested. The schedule for onion production in Mang'ola and Barai division is shown in table 11.

Table 11: Seasonal calendar of onion production in Karatu District, Arusha Region of Tanzania.

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Dry Season			Long Rain			Dry Season					Short Rain
Planting						Planting					
		Harvesting						Harvesting			
	1. Season/ High supply						2. Season / Low supply				

(Source: Qualitative survey, own outline)

Onion cultivation in Karatu District is carried out using **irrigation**. Most farmers carry out irrigation themselves using spring water. 10 years ago a European company installed a water pump in Gorofani village. Since then, irrigation of higher fields is possible. Farmers and extensionists explained that this had an extremely positive effect on the livelihood situation of the farmers: the average yield and thus the profit for the farmers increased, the village grew and developed and people became richer. Usually irrigation and water from the well (spring) is free. A water-irrigation

administrator, elected by the farmers, manages the water distribution. He decides who and when each farmer is allowed to irrigate.

Cultivation of onions requires a variety of procedures in the fields such sowing, planting, irrigating, spraying or weeding and harvesting. Most farmers are in need of **additional labour**, thus they usually employ daily workers, who are paid in kind.

Median **yield** per acre in 1st season with regard to the farmers interviewed in Karatu District is 10,800 kg or around 100 sacks per acre. In 2nd season, when production conditions are worse because of less favorable weather conditions farmers harvest in Median 8,400 kg.

Post-harvest losses do not seem to be a major constraint for onion farmers in Karatu District. They state that waste is between 5% and 10% of the yield. Losses arise because of pest problems and bad weather conditions or when farmers are not able to store their harvest. But the majority practise good post harvest management. They have access to well aerated **storage** places that can keep onions in good condition for a period up to six month. The storage facilities as shown in the picture below are low houses with raised floors made out of grass and local material, where it is possible to store seven to ten tons. To avoid onions getting wet and thus reduce the risk of spoiling, farmers usually start storing before the rainy season begins. Thus most of the onions planted from July to September are stored after harvest and sold up to the end of May when the onions planted in February are harvested. Storing possibilities are important for farmers because this avoids flooding markets and enables them to increase their profit by selling in times of low supply. As a result, onion farmers of Karatu District have developed a competitive capability to supply onions to the regional markets throughout the year.

Storage house in Karatu, Tanzania
(Source: SLE-Team)

All the farmers stated that prior to being packed onions are sorted into two different **grades**. This takes place directly in the field and is usually done by employed workers. Onions are differentiated into roundish and twin-onions. Twin-onions are hardly sold or only for cheap prices. The roundish onions receive better prices and are sold to the wholesale markets in Tanzania (Arusha) and Kenya (Nairobi and Thika). Before buying, brokers and intermediaries check the quality of the skin. When onions arrive at the wholesale market, they are sorted again by intermediaries or wholesalers into three different grades before being sold. The first and best one is a round and hard onion with a medium size and perfect skin. The second grade consists of big onions or twins with intact skin. The onions with skin blemishes, twin or not round, are sold as third grade. The same grades also exist in Kenya.

The onions sold in Tanzania are packed at farm level into sacks that officially carry 100 kg. All actors and key resource persons interviewed agreed that in reality the weight ranges between 120 – 150 kg. These **units** are made out of two bags of around 70 kg which are then sewn together. The enlargement of the bag was established through pressure from traders, who prefer trading big units to reduce their loading costs. The farmers explained that they had to comply with the traders orders and could not object because they depend on the traders' goodwill to buy the onions. The risk of losing the entire yield is high if farmers do not pack properly, because it is common that wholesalers or brokers at the wholesale market in Arusha refuse to buy a badly packed bag or will pay a much lower price. In high supply for example farmers receive around 17,000 – 19,000 TZS (13.1 – 14.6 USD) for a full bag whereas for a badly packed bag traders pay only approximately 15,000 TZS (11.5 USD). The risk that farmers are cheated and exploited is high, because the weighing scales for the sacks are not monitored when they are sold at the farm gate or wholesale market. The price only refers to the whole sack. The farmers explained that the Tanzanian government is trying to reduce the size of the bag and introduce regular scale monitoring, but until now no changes have been noticed.

The standard unit for exporting onions to Kenya is a 14 to 17 kg net. To protect carriers and farmers from being exploited and to better monitor the volumes traded, it is forbidden in Kenya to trade onions in the big Tanzanian bags. But most Kenyan traders refuse to comply with the regulation, so the majority of the Tanzanian onions traded to Kenya are still packed in big bags as the study team noted in the different wholesale and retail markets in Nairobi and Thika.

The qualitative and quantitative analysis revealed that farmers **are poorly informed regarding demand**. They produce as much as they can and do not know who is going to buy which amount of their yield. Furthermore, they lack knowledge regarding market prices and thus depend on brokers', traders' or wholesalers' information.

The **cooperation and organization level** of onion farmers in Karatu is relatively low. Despite some grading, packing and sewing of sacks as well as – in exception – organising transport to the wholesale market, which they sometimes perform together, every farmer works individually. But extensionists told the study team that they plan to establish a SACCOS Group (see Box 2) in the near future to improve access to credits and their bargaining position. A possible office in Barazani already exists.

Most farmers **sell** the commodities directly at the farm gate to intermediaries who take the goods to a broker at the wholesale market. Due to very poor infrastructure in Karatu District, especially in Barai and Mang'ola Ward, it takes at least four hours to drive a lorry from the onion villages to the district capital Karatu and from there again at least three hours to Arusha. Therefore, only a few farmers are able to transport their products to the wholesale market because it is too expensive and very time consuming. The **transport** is mainly organized by traders from Arusha or from Kenya, who possess more financial capital to hire trucks.

Furthermore, farmers complained that the wholesale market is often not even accessible for them because a broker cartel controls it and has introduced a rule, rendering it difficult for farmers to sell there. They need a license which is expensive and unavailable for the majority of the small-scale farmers.

Farmers stated that they do not have constant and formal (business) **relations** with **brokers** or **intermediaries** who buy their produce. There is little trust between these two parties. Each side, i.e. sellers and buyers, are looking for the best price. Farmers and extensionists state that selling prices at the farm gate or at the wholesale market are dictated by the broker, intermediary or wholesaler. The broker promises the farmer a price that he is going to achieve at the market. For each bag sold at the wholesale market the broker receives a commission of 300 – 500 TZS (0.23 – 0.38 USD) from the farmer. The difference to the selling price at farm gate has to be paid back to the farmer. Normally the broker tries to sell the products for a higher price than arranged with the farmer and to keep the difference. The farmer only receives the money after the broker has sold everything. Sometimes the broker does not pay in time. "He says he will pay in a week, but then he pays later" complained one farmer interviewed. The qualitative analysis shows that farmers are highly dependent on brokers and intermediaries, because these have the power to dictate the selling price at the wholesale market as well as the time to sell the products. Both aspects impact on the profit for the farmer. According to the farmers, brokers take advantage of the situation and exploit them. This is supported by the extensionists interviewed who assessed the brokers to be the VC operators who profit the most.

Trade Level

Onions are one of the main crops traded at the Kilombero Wholesale Market in Arusha (see chapter 4.3.1). It is the most important vegetable market for onions in Northern Tanzania. In times of high supply 120 tons up to 225 tons[13] are traded daily (P22). During low supply the quantity ranges from 24 tons up to 67.5 tons[14]. The majority of the onions come from Karatu district. They are sold to Tanzanian traders and also to Kenyan traders, who transport 80-100 tons per month to Kenya.

The first **actors** involved in onion trade behind the farm gate are the **brokers** and **intermediaries** in the production areas as explained above. If traders are in need of onions, they call their brokers to inform them of quantity and quality required. Traders do not have regular co-operations with farmers, but with brokers. Basically the broker's function is to help the traders find out which farmer has just harvested and wants to sell his onions. Brokers appear to be in a comfortable bargaining position towards the farmer because they run little risk of losing money. Some brokers mainly cooperate with Tanzanian traders at the Kilombero wholesale market in Arusha, the others principally with traders and transporters from the central wholesale market in Nairobi (Wakulima) or other Kenyan markets. Most of the traders cooperate with only one broker in the production region, who deals with several farmers and provides the traders with goods. The analysis of the quantitative and qualitative data shows that brokers play an important role in the trading business of onions in Tanzania and both farmers and traders depend on their knowledge and willingness to bargain a fair price. Furthermore, brokers have the power to influence the time it takes to sell onions at Kilombero because they form a strong brokers group who control all incoming goods (cp. above). The **Kilombero traders association** was established in 1999. The approximately 100 traders are striving to establish for the supremacy of the onion market of Northern Tanzania. Their strength plays an important role (see also chapter 5.2.). They are not only well organized with regard to cross-border trade but, they have also built up a SACCOS group some years ago (see box 2), to receive government subsidies. In addition to the actors organized in the above mentioned association, intermediaries from Kenya and elsewhere (for example Uganda) also trade at the Kilombero market. Despite the existing association traders stated that they cooperate very little with one another. "Everybody is busy running his own business" mentioned one trader. But at least the majority of the traders interviewed share **information** with fellow traders as the quantitative analysis revealed. Furthermore, the mobile phone is an important invention for picking up information.

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[13] 10 trucks are traded daily with 100 to 150 bags per lorry. 1 bag is 120-160 kg. (10 truck of 100 bags of 120 kg: 120 tons / 10 trucks of 150 bags of 150 kg is 225 tons)

[14] 2 trucks of 12 tons up to 3 trucks of 22,5 tons.

According to the traders the worst constraint concerning their business is the poor infrastructure at the wholesale market. Especially in the rainy season they lack sufficient **storage** capacities. Furthermore, traders complain about price fluctuations that make it difficult to calculate income and lack of access to credits.

The **porters** at Kilombero wholesale market belong, together with the casual workers at the production level, to the weakest actors in the value chain. Their key constraint is the low and irregular income. They depend on the market situation, – in low supply, the demand for carriers is also low – and their employees. The porters stated that sometimes retailers and wholesalers do not pay the agreed amount of money. Furthermore, they suffer health problems such as respiratory complaints, caused by pesticides used to treat the onions against spoiling. The extension officers in the production district are also aware of this over application of pesticides. Nevertheless, farmers and traders continue to apply these quantities. They claim that they do not have any other alternatives to protect the onions.

Marketing Level

The daily **volume** of onions traded on the two retail markets of Arusha is 2.6 tons as representatives of the market authority estimated.[15] But it should be taken into account that this volume differs according to the season. The onion retailers are mainly specialized in selling this one crop (see chapter 4.1). Only a few, who own for example a bigger market stall inside the retail market also retail other fresh fruits and vegetables.

Around 100 retailers, who provide Tanzanian consumers with onions, are active on the Kilombero retail market and the Arusha Central Market. Generally, the Tanzanian traders, retailers, hawkers and kiosk sellers do not possess weighing scales. The market Master interviewed explained that only a few larger market retailers use them. The **measuring units** retailers use when purchasing and selling the commodities often differ. They buy the onions from wholesalers in big bags or in nets. The commodities are then transported to their market place at the retail market by hired carriers and hand-cart drivers. Prior to selling the retailers usually grade the onions again. The majority of the retailers sell onions in buckets of 2-4 kg. Hawkers and smaller retailers sell in small quantities of 3 or 4 onions.

For new retailers who want to sell FFV, **access to the market** place is very difficult because space is limited and already very full. Only when a market stall closes can a new retailer start working there.

[15] 100 retailers: 20 bags: Daily turnover: 5.2 tons. One bag is around 130 KG. One retailer sell per average 52 kg daily or 1.56 tons monthly. Kenya: 1.4 to 1.8 tons per retailer monthly.

The retailers on the market know each other very well, especially those who work side by side. Although they are not organized in a formal **cooperation**, there are many different forms of informal cooperation. They help each other with minor problems such as when somebody needs small money for change or they look after the market stall and products when the retailer is absent for a while.

If the supply of certain produce is limited due to seasonal undersupply, then often retailers just sell something else to keep their place and to continue with their business.

Onion retailers at Arusha Central Market, Tanzania
(Source: SLE-Team)

Transport

Traders and farmers involved in the onion trade have to rent the trucks and lorries from transportation-entrepreneurs. The vehicles are rented with a driver who is employed by the transport-entrepreneur. Traders from town can arrive without transport vehicle and rent a lorry in the villages of the onion production area in Karatu District. A few farmers also hire pick-ups from there and transport onions to the wholesale market.

4.2.4 Costs, prices and profits

This subchapter sets out the costs, prices and profits achieved at different levels of the value chain. Apart from qualitative information from expert interviews and focus-group discussions, quantitative data collected by means of the value chain questionnaires is analysed.

Input and Production Level

The main production costs for onion farmers in Karatu District comprise paid labour and input costs for seed, fertilizer and pesticides. Storage is also an important cost factor in 1st season for some farmers interviewed. The major costs for farmers turned out to be the employed workers. Farmers pay for labour in Median 621,000 TZS (477.69 USD) per season and acre or 44.61 TZS (0.03 USD) per kg of yield and season. Especially for weeding, which is carried out four times in a season, a farmer has to employ many field workers.

As explained before the majority of farmers is trained in CBSP and produce the seeds for themselves. Only one third of the farmers interviewed have to buy onion seeds. They pay in Median 81,000 TZS (62.31 USD) per season and acre of cultivated land. With reference to the amount of yield produced in kg it results in 25 TZS (0.02 USD) per season. Fertilizer costs in Median per season and kg of yield are 21.26 TZS (0.016 USD). Farmers spend only half of this amount for pesticides. They pay 11.4 TZS (0.008 USD) per kg of yield in one season. Some farmers also have to pay for storing the onions. Sometimes they pay in kind, e.g. 10 sacks to store of 100 sacks. Converting this into money, it results in around 10 TSZ (0.008 USD) per season and kg of produced yield. Table 12 gives an overview of the main production costs for onion farmers in Karatu. As an example it only shows the costs in 1st season.

Table 12: Production costs of onion production in Karatu District, Arusha Region

Main production costs in 1st season		Per acre		Per kg of yield	
		TZS	*USD*	*TZS*	*USD*
Paid labour		621,000	477.69	44.61	0.03
Input	Seed	81,000	62.31	25.00	0.02
	Fertilizer	205,000	157.69	21.26	0.016
	Pesticides	102,000	78.46	11.40	0.008
Storage		135,000	103.85	9.82	0.008

(Source: own compilation)

Production costs for the 2nd season are slightly less due to the fact that farmers only need to store after first season when there is high supply at the markets. In 2nd season farmers do not incur any costs for storage.

Table 13 shows costs, selling prices and the profit for the onion farmers in 1st and 2nd season.

Table 13: Costs, prices and profits of Tanzanian onion farmers in 1st and 2nd season

Figures on Production Level per kg (in USD)		1st Season	2nd Season
Costs (Median)		0.08	0.06
Selling prices	**Variation**	0.06 – 0.10	0.22 – 0.40
	Median	0.08	0.31
Profit (Median)		0.00	0.25

(Source: Quantitative survey of VC actors, own computation)

Fluctuation of selling prices at farm gate between the seasons is very high. The price in 2nd season (0.31 USD), when supply and competition are low, is more than four times as high as in 1st season (0.08 USD). Subtracting the costs per kg of onions from the median selling price of a farmer the profit per kg at production level is calculated to be zero in 1st season and 0.25 USD in 2nd season (Tab. 13). Since production costs in 1st season are as high as the price a farmer receives per kg of onions produced, most farmers do not make any profit. But due to high profits in 2nd season, when farm gate prices rise, onion cultivation seems to be still very profitable in Karatu with 0.25 USD per kg.

Trade Level

With regard to the costs and prices the different actors in the trade segment must be differentiated. Brokers, intermediaries and wholesalers have different costs and different prices. Therefore, they also achieve different profits. Table 14 only shows

the costs, prices and profits per kg of onions for intermediaries who sell at the wholesale market to wholesalers. Transport costs, i.e. from production site to the market (including road fees) as well as for carriers at the market form the major portion of their expenses. Further costs incurred are market entrance fees and fees for all goods brought to the market. In contrast, wholesalers do not have many expenses except market fees. Also, brokers do not face high costs because they work on behalf of intermediaries or farmers. Market fees to the city council, packaging sacks, loading, and unloading are further costs that can impact on the traders' (particularly the intermediaries) business. Their costs are the same in both seasons and with 0.08 USD per kg of traded good as high as the costs for producers.

The differences between farm gate prices and purchase prices for intermediaries (in Median) can be explained by the high price fluctuation. Each respondent tends to cite a good price in his/her perception. Particularly for low supply it is becoming clear that there is no fixed farm gate price and prices are highly dependent on the bargaining power of the individual farmer and broker or intermediary as well as on the day and time of purchase. Bearing in mind the price variations given in tables 12 and 13, both figures are reasonable.

Table 14: Costs, prices and profits of Tanzanian onion intermediaries in high and low supply season.

Figures on Trade Level per kg (in USD)		**High Supply**	**Low Supply**
Purchasing prices of intermediaries at farm level	**Variation**	0.06 – 0.08	0.19 – 0.27
	Median	0.07	0.24
Costs (Median)		0.08	0.08
Selling prices of intermediaries on markets	**Variation**	0.16 – 0.17	0.2 – 0.41
	Median	0.17	0.42
Profit (Median)		0.02	0.05

(Source: Quantitative survey of VC actors, own computation)

The selling prices of intermediaries in high supply do not differ very much. The variation is only 0.01 USD form the lowest to the highest price given by the intermediaries. In contrast to that, the price range is rather large in low supply, given the fact that daily fluctuations in demand and supply have more impact on prices in low supply than in high supply, when the market is always full of products to sell.

The intermediaries' profit per kg in times of low supply is higher than in high supply, though purchasing prices at farm gate are already high. Nevertheless, there is a wide price margin from farm gate price to selling price at the wholesale markets. In high

season intermediaries' profit is a little bit lower, because the quantity of goods traded increases as well as the number of other trading intermediaries at the markets. Therefore competition between them increases and they depend more on brokers' knowledge to contact supplying farmers as well as demand wholesalers.

Marketing Level

The profit for market retailers depends mainly on purchasing and selling prices at the markets, which are determined by the supply situation. As shown in table 15 retailers business during both seasons seems to be very profitable. This is explained by a wide range between purchasing and selling price and simultaneously only low costs. The retailers' costs mainly comprise the market fee and transport costs from the wholesale market to their selling place. At Kilombero and Arusha Central Retail market this fixed fee is 200 TSH (0.14 USD) for the simple and cheap places without infrastructure and 6000 TSH (4.6 USD) for bigger market stalls with wooden tables and scales. The costs are more or less the same in both seasons as well as the profit per kg. An assumption as to why the margin in low supply is a bit lower than in high supply is that retailers do not pass the whole price fluctuation on to consumers because they might purchase less if the price is too high. In general, the high profit margins per kg for retailers are surprising because their livelihood situation is very poor as illustrated by the livelihood analysis (cp. 4.1.3 and annex IV). An explanation for this could be rather unrealistic price information from retailers, because the quoted selling prices are much higher than the purchase prices given by consumers. Furthermore it can be assumed that post harvest losses, which have not been considered in this analysis, are high and therefore reduce the retailers profit in reality.

Table 15 gives an overview pf purchasing and retail selling prices, costs and the median profit for retailers.

Table 15: Costs, prices and profits of Tanzanian onion retailers in high and low supply season.

Figures on Trade Level per kg (in USD)		**High Supply**	**Low Supply**
Purchasing prices	**Variation**	0.13 – 0.62	0.42 – 1.15
	Median	0.19	0.62
Costs (Median)		0.01	0.01
Selling prices of	**Variation**	0.27 – 0.77	0.82 – 1.15
	Median	0.42	0.82
Profit (Median)		0.22	0.19

(Source: Quantitative survey of VC actors, own computation)

Overview of profits of operators in the Onions Value Chain in Tanzania

Figure 12 gives an overview of the profits per kg of farmers, intermediaries and retailers in high and low season. This comparison shows clearly that in high supply retailers' profit per kg is the highest compared to the other VC actors considered in this calculation. They gain 0.22 USD per sold kg of onions, while farmers' profit is zero and intermediaries only receive one tenth of the retailers profit per kg.

In low supply the picture changes and the group that profits most per kg are the farmers. Their high profit per kg is based on extremely high selling prices at farm gate in low supply because they are in a good bargaining position due to high demand at the markets. Intermediaries again only receive 0.03 USD per kg because they have to face relatively high costs which cannot be balanced by the price difference between selling and purchase price. Again, retailers' business is quite profitable at 0.19 USD per kg.

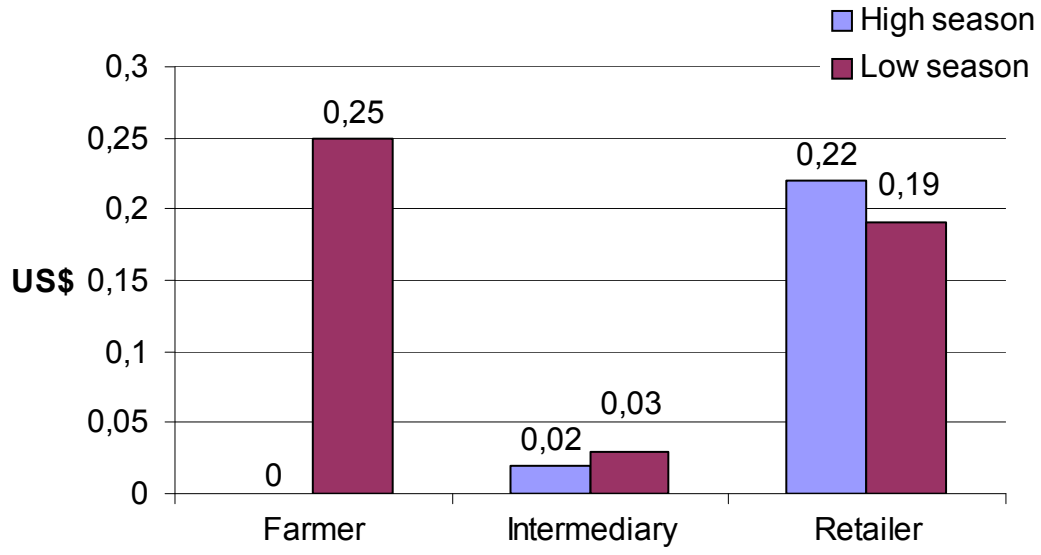

Fig. 12: Profit per kg in high and low season for farmers, intermediaries and retailers in the Onion-VC in Tanzania.
(Source: Quantitative survey of VC actors, own computation)

To appreciate the real profit distribution among the actors, it is necessary to also consider the volumes traded and thus examine the share of profit per season, which is depicted in figure 13. Intermediaries trade high quantities, in Median 10 to 15 times more per season than farmers and retailers. That means that the profit per season for an intermediary increases compared to farmers and retailers. In high season when wholesalers' profit per kg is already higher than for the other actors, this unequal profit distribution is even more pronounced. Traders gain 94% of the share

of profit per season, in comparison retailers only gain 16% and farmers do not make any profit in Median, thus their profit share is zero.

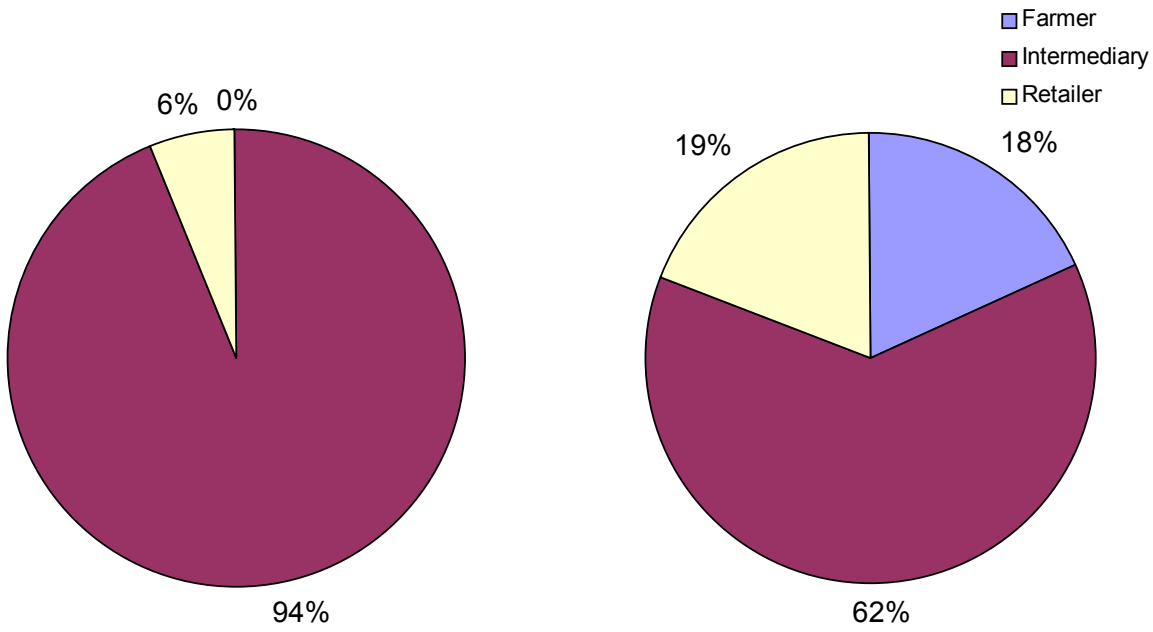

Fig. 13: Share of profit of different actor groups per season in the Tanzanian Onion-VC.
(Source: Quantitative survey of VC actors, own computation)

In low season again intermediaries are the group who achieve the highest profit share (62%) due to its quantities traded. During this period farmers receive a very high profit per kg, which leads to a profit share of 18% per season. Retailers gain 19% in low season, though their profit per kg is higher than the wholesalers' profit per kg. This is explained by the lower quantities traded per person. There are many more retailers on the markets than intermediaries or wholesalers. So they have to share the total volume of goods and thus the profit.

Box 3. The role of supermarkets

The role that supermarkets might play in the near future in the African FFV market has been widely discussed.

Even while supermarkets were only a secondary aspect of this study, some closer insights were able to be gained, contesting some of the most common assumptions in this field.

There are three basic assumptions to the role of supermarkets. 1) the importance of supermarkets is growing due to the different demands of the new middle and upper class (NEVEN AND REARDON 2004; WEATHERSPOON 2003 both quoted from TSCHIRLEY ET AL. 2004), 2) supermarkets demand higher standards and therefore will be a driving force for the distribution of standards (VAN DER MEER AND IGNACIO) small holders face the danger of exclusion from this market, if they do not adapt quickly enough and build contract relations with supermarkets (TSCHIRLEY ET AL. 2004: 40).

The first assumption has already been challenged by TSCHIRLEY ET AL. (IBID.), calculating that even in Nairobi supermarkets' share in the FFV market accounts for only 5 % and less elsewhere. It can be assumed that this figure is even lower in Tanzania. While a growth potential due to increasing urbanisation and the new middle classes definitely exists, its share should not be overrated. As long as the majority of Kenyans and Tanzanians lack the income to regularly buy in supermarkets their market share will remain low. TSCHIRLEY ET AL. estimate a 10-20 % maximum share in FFV market in ten years time (IBID.). This is in line with the observations the research team made in Nairobi and Arusha, where the supermarkets catered mostly to the expatriate community and a small upper class. An exception to this is Uchumi whose customers seem to be more local from the lower to upper middle class according to a key resource person.

The second assumption would appear to have been disproved. This is that as most of the supermarkets use the same wholesale channels as the classic market or street retailer. I.e. the products they buy are the same quality as the ones on the street. Exceptions from this are only the really big chains like Nakumatt and Uchumi in Kenya and Shoprite in Tanzania. Those have contracted or at least have regular suppliers. This might be important in terms of consistent quality but this also only relates to the appearance of the produce, as none of the supermarket chains checks for chemical residues or other non-visible aspects. Based only upon appearance the research team found in spot checks that the quality of the produce seems not to be substantially different from those products sold on traditional markets.

The only real lead on the distribution of standards was given by Greengrocers Zucchini Ltd. In Nairobi who explained that certain hotels employ private institutes to check the products they buy for residues.

For the third assumption we find a mixed picture, while the bigger supermarket chains (or wholesale suppliers like Zuchini Ltd.) have some steady suppliers. Most of them do not have contractual agreements with them, as Uchumi has experienced non-fulfilment by the farmers in the past. Uchumi for example receives its tomatoes from five different large scale farmers, while the onion supply is mostly catered for by small scale farmers (around 200 different ones). The suppliers often come directly to Uchumi to offer their produce. Price and quantity agreements are negotiated often on a daily basis by phone. Farmers are therefore also not bound to a specific product quantity, only to a certain quality. While the prices offered by supermarkets to the farmers are almost double the normal wholesale price it is still lucrative for farmers to buy the missing amount from other channels.

In the tomato sector Uchumi for example works directly with the suppliers i.e. without any brokers. For onions they try to exclude brokers but this is virtually impossible as the producers are too scattered.

While there are opportunities for small scale farmers here, the exclusion assumed in the respective literature derives from other aspects. One is that most of the supermarkets do not pay the farmers or traders directly but after a day or some weeks. This is often not acceptable for small scalers. Also the risk of damage to the vegetables during transport to the supermarket is often too high.

Supermarkets and their large scale supplier companies therefore seem to offer an alternative option for some farmers, and also to small holders who produce/live close enough to the supermarkets and also have another source of income. That large scale exclusion takes place is a) unlikely and b) would have no important effect on the traditional markets that are more important to small holders.

Packed tomatoes in a supermarket in Nairobi, Kenya
(Source: SLE-Team)

4.3 Mapping Kenya

4.3.1 Research Areas: Production Regions & Markets in Kenya

Central Province

The Kenyan production areas investigated are located within the **Central Province** in the north of Nairobi. This province covers an area of 13,200 km², approximately 2.3% of the total Kenyan landmass. The 1999 census[16] counts about 3.7 million people, which is equivalent to 13.0% of the country's total population. Central Province is characterized through (former) good agricultural conditions due to fertile young volcanic soils at suitable altitudes and a high population density of 282 persons/km². However, it has to be taken into account that agricultural overuse led to degradation of soils through erosion resulting in decreased fertility (GoK, MoA 2007).

With regard to the poverty rate, Central Province is distinguished from other rural areas through better living standards. It ranks as the least poor province in Kenya. Poverty[17] is relatively modest with 31%, most districts falling below poverty rate of 30-40%. But still, there are over 1 million poor people in the province due to its high population (see tab. 16) (MoA 2007).

Table 16: Absolute and relative poor households and persons in Central Province per district.

District	Households below poverty line 1999	Individuals below poverty line 1999	% population below poverty line 1999
Kiambu	44,330	225,117	20-30
Kirinyaga	26,742	138,307	30-40
Murang'a	19,839	105,387	30-40
Nyandarua	24,396	145,205	30-40
Nyeri	39,442	200,047	30-40
Thika	40,092	195,375	30-40
Maragua	21,205	117,389	30-40
TOTAL	216,047	1,126,826	31

(Source: modified after CBS 2001: 16)

[16] Population and Household Census (1999), Counting Our People for Development: Population Distribution by Administrative Areas and Urban Centres, Volume I, Republic of Kenya.

[17] According to Participatory Poverty Assessment report of 2001 defined poverty "as the inability [for households and/ or individuals] to meet their basic needs including land, employment, food, shelter, education, health etc" cited from Poverty Reduction Strategy Paper. Rural poverty line: consumption and expenditures valued at less than Kshs. 1,239 per adult equivalent per month

We concentrated our research on two of the seven Central Province districts, namely Kirinyaga and Nyeri (tab. 16). Kirinyaga plays an important role in Kenyan tomato production while Nyeri is the main area for onion cultivation in the Central Province.

Kirinyaga District, in the north-east of Central Province covers 1478 km² and exhibits a population density of 309 persons/ km². It ranges from areas of high altitude around the top of Mt. Kenya (5199 m) with annual precipitation of 1600 – 2200 mm to low midland areas of around 800 m with only little rainfall of 800 – 900 mm. Tea and coffee are the main cash crops grown on 97,500 ha arable land, though in the lower midlands irrigated rice predominates. The district is divided into four administrative divisions: Ndia, Central, Gichugu, and **Mwea**. Tomato farmers are mostly found in Mwea Division, which is located on the border to Eastern Province and is the poorest division in Kirinyaga with 40 % of the population below the poverty line. It covers 512.8 km² and is characterized by the agroecological Low Midland Zone whose climate enables two short cropping seasons. Available arable land per person accounts only for about 0.4 ha. Due to high population density and the location of the largest Kenyan rice irrigation scheme in Mwea, land is limited and thus very expensive.

Table 17 and 18 show some basic data about Mwea Division.

Table 17: Basic data I about Mwea Division: (agricultural) area, population and % of poverty.

Extension (in km²)	Agricultural land (in km²)	Total population	Population density (persons per km²)	% population below poverty line 1999
512.8	504	125,962	246	40

(Source: GoK 1999)

Table 18: Basic data II about Mwea Division: households, composition and agricultural land per person.

Total number of Households	Composition of Family		Persons per Household	Agricultural land (in ha) per person/ Household
	15 years and above	Under 15 years		
31,540	2.5	1.4	4.0	0.4/ 1.6

(Source: GoK 1999)

Tomatoes are the second important cash crops in Mwea Division after rice whose widespread cultivation is explained by the rice irrigation scheme.

Nyeri North District, Kieni West Division

Kieni West is one of the seven administrative divisions of **Nyeri District**. It is administratively divided into 5 locations (Mweiga, Endarasha, Mwiyoko, Gararakwa, and Mugunda) and 20 sub locations. It occupies an area of 542 km² of which 456 km² are cultivatable. The division is marginal and the bulk of it lies in agro-ecological zones Low Highland 4 (118 km²) and Low Highland 5 (120 km²). There is also a smaller zone of upper humid 2 (89 km²). The division is situated in a marginal area receiving unreliable rainfall which is below 300 mm p.a. for most areas. There are two rainfall seasons: The division is a cold highland with altitudes ranging from 1,920-2,500 m above sea level. The temperatures range between 15° C and 27° C with average of 19.5° C. The division is good for production of most food crops. Major crops are maize, beans, potatoes, onions, wheat, cabbages and tomatoes. Main constraint is unreliable rainfall which is poorly distributed throughout the year. Crop failures are common especially in the lower areas of the division. Individual land sizes range from 1 acre (0.4 ha) to 300 acres (120 ha), average being 5 acres (2 ha). The 1999 census came to a population of 80,000. Of over 15,640 farm families more than 11,000 own a farm. There are 48 primary and 9 secondary schools in Kieni West.[18]

Researched Markets in Kenya

Wakulima market is the most important wholesale market for horticultural products in Nairobi. It is one of the two markets where only fresh produce is traded. Wakulima also includes a retail market. It is located in the city centre which means that all commodities have to be transported through the traffic of Nairobi. Wakulima market has two roofed areas providing shelter for traders during rain. The market place is owned by the Nairobi City Council (NCC) and civil servants are in charge of collecting the market fees on a daily basis. The market authority does not perform any quality assurance or standard control of the products being sold. There are two kinds of market fees. One is the fee traders or retailers pay for market entry and their stall, the other one is the fee paid by intermediaries per unit of commodities traded on the market. Those fees are important for the city council's budget. With the growing population and increasing demand for fruit and vegetables, the market reached the limits of its capacity. Currently app. 3,000 wholesalers and retailers do business on a daily basis, far more than the market was designed for. Therefore, wholesale trade moved partly to other retail markets in town resulting in a loss of wholesale shares at

[18] Information from Ministry of Agriculture Division Kieni West

Wakulima. Wholesale trade at some of these market places is set up illegally and without a licence from the NCC.

Gikomba market is located near Wakulima. It is one of the markets that emerged because of the limited space at Wakulima. The market actually developed on the streets when the traders started their business in New Pumwani and Quary Road. This is also the reason why Gikomba market has no infrastructure, no paved roads and no buildings. Gikomba does not provide adequate facilities in terms of hygiene, security and shelter against rain and sun. The traders and retailers are still operating from the roadside. According to NCC the traders are not supposed to sell there, however business people have to pay a market fee to the NCC, receiving little in the way of service in return. Wholesale trade takes place in the morning from 4 am until 8 am on New Pumwani Road. At 8 am the wholesalers have to vacate the place. From 8 am onwards the same place is used for retail activities.

Thika is located 20 km north of Nairobi. It is an important market for the northern region around Nairobi. The new market where onions and tomatoes are mainly traded has little infrastructure, providing no shelter and no regular garbage collection.

Two further local markets in the production regions were considered. **Karatina** market is a big local market in Nyeri North. It has a fenced area for retail but no proper place for wholesale. There is no infrastructure such as sanitary facilities, roof or store provided by the city council at this place. In **Kutus** in Mwea Division wholesalers operate right outside the market from 7 to 9 am. Inside the market fence retail is carried out all day long.

Gikomba Market in Nairobi, Kenya
(Source. SLE-Team)

Kutus Market, Kenya
(Source: SLE-Team)

4.3.2 Tomatoes in Kenya

The following pages describe the value chain for tomatoes in Kenya with regard to the production areas and markets under consideration. After presenting the actors and detailed information on their activities and relations, the costs, prices and profit margins along the value chain are depicted.

4.3.2.1 The Actors, their Activities and Relations

Input level

Input suppliers are ubiquitous in Mwea Division. Over 20 stockist firms, retail shops supplied by large companies, are located there. They advertise widely through radio, public poster and wall/house paintings. As farmers interviewed in Mwea Division stated, stockist activities not only include advertising and selling of inputs, but they also work as extensionists and important informants for farmers, who update their knowledge on production issues (new diseases, appropriate chemicals, good seeds) while buying the recommended products. A researcher interviewed from the Kenya Agricultural Research Institute (KARI) complained that in the past farmers have been misled and influenced by stockists in Mwea Division to apply large amounts of fertilizer and pesticides, which lead to serious chemical residues on tomatoes. This statement was supported by agricultural extensionists from Mwea Division, who also cited low education levels of farmers and workers as a reason for overuse. Representatives of the Kenya Horticultural Development Program (KHDP) point out a lack of information and capacity building concerning appropriate use of pesticides. But all key resource persons interviewed notice a slightly positive development over the past few years due to increased public and policy awareness, capacity building by private and public extension services as well as detailed guidelines on fertilizer and pesticide bags. *“Today they are better able to determine which disease affects their plants and spray the appropriate product and amount to treat the problem”* scientists from KARI stated. However researchers from icipe and KARI complain that farmers still know too little about correct pesticide application techniques, hence they use pesticides in a sub-optimal way. *“More information and dissemination is required”*, demanded an extensionist of Mwea Division. KARI, which cooperates with tomato farmers in Mwea Division has just started a project on Integrated Pest Management (IPM) methods (e.g. soil solarisation). But they admit that IPM is still unknown to farmers and that applying organic chemical, which was also strongly recommended by extension services, failed. KARI researchers explain that farmers prefer the “knock-down” effect of pesticides and that it takes time to convince them. Producers on the other hand stated that they had had bad experiences and had to

struggle with even more diseases and higher costs. In the following season they resorted once again to using conventional chemicals.

Production level

Basic data and activities

Production of tomatoes in Mwea Division is dynamic, i.e. the cultivation area fluctuates from season to season. But extension officers explained that in the last five years an increase in tomato production could be perceived, because farmers tend to shift from food crops to tomatoes. In 2006 tomatoes were produced on about 1450 ha (GoK, MoA 2007). The majority of the producers are small and middle scale farmers who own 0.5 to 3 acres. Only a few farmers possess more than 3 acres. Farm sizes according to the farmers' perception and statements of agricultural extension officers are shown in table 19.

Table 19: Definition of small medium and large scale farmers according to the perception of producers in Mwea Division.

Farm size	Acres
Small scale	0.25 – 1
Middle scale	1 – 3
Large scale	> 3

(Source: Own Compilation)

Usually tomato farmers in Mwea Divsion cultivate tomatoes twice a year and intercrop with maize and/ or french beans. Table 20 shows the seasonal calendar of tomato production in Mwea Division, which of course can vary depending amongst other things on farming system, plot size and variety used.

Table 20: Seasonal Calendar of tomato-production in Mwea Division.

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep.	Oct.	Nov.	Dec
Seed bed	Main farm		Harvest			Seed bed	Main farm			Harvest	
Dry season			Long Rain			Dry season			Short Rain		

(Source: Own Compilation)

During one season tomato cultivation requires different activities including plot preparing, sowing, planting, weeding, watering, staking, spraying of pesticides,

applying fertilizer and finally harvesting. For all activities farmers usually require additional labour.

The **yield per ha and season** of the farmers interviewed range from 17 t to 81 t. The average yield accounts for 38 t (Median: 36 t). It has to be taken into account that farmers' statements differ from official data. According to information from both the Ministry of Agriculture and the Extension Officer in Mwea, yield peaks to 15-17 t per ha and season (GoK, MoA 2007). A study from KARI supports the lower amount of yield per ha, providing the number of around 13 t per ha that tomato farmers in Mwea Division achieve (Waiganjo et al. 2006). On the other hand the results of the analysis of the research team correspond with statements from KHDP that has been monitoring production costs and yields in Mwea Division for three years. According to them the average tomato yield/ ha in Kenya ranges from 20 t fo 250 t.

Varieties mainly cultivated by farmers in Mwea are Onyx, Cal J and Riogrande, notable for high yields and large fruit size, demanded by consumers, as the consumer questionnaires showed. Though farmers complain about regular harvest losses due to diseases (esp. leaf curl and leaf blight), only a few are aware of new varieties that show better resistance to plant disease and even obtain higher yields, e.g. Valoria F1 Hybrid. Furthermore, the quantitative analyses shows that seed cost play an important role in the farmers' choice of which variety to grow.

Most tomato farmers in Mwea have access to **irrigation** thanks to the canals that were built by the rice irrigation scheme. Water supply in general is public. Producers are organised into local Water Groups, which belong to the National Irrigation Board. Membership fee for the Water Groups is relatively low (200 KSH (2.94 USD)/ month) compared to rice growers, but farmers have to pay for maintenance of the canals that supply water to the fields. However, irrigation of distant farms located away from water bodies or on higher ground is costly due to the high cost of fuels. Only richer farmers can afford to install private pumps. The other ones, especially small-scale farmers in more remote areas, depend on rainfed irrigation. Moreover, canal water is not always sufficient for all tomato growers, particularly for those in lower areas, where water arrives last.

After fruits and vegetables are harvested, initial **sorting and packaging** is done at the farm level in readiness for delivery to the market. Packaging is performed either by the farmer and/or trader depending on the point of sale, though most traders who buy directly at the farm level prefer to pack themselves. Normally, tomatoes are graded into four to six different grades depending on the sizes available and taking into account skin blemishes, with grade one being the biggest tomato without skin blemishes. These grades are informal and not set up as standards, therefore they are not monitored, but known by all actors. In this chapter tomatoes of good or high

quality refer to grade 1 and 2. The poorest grades (4-6) are either eaten at the household level or sold locally. Marketable grades are packed into wooden boxes of mostly 60-64 kg. Only one respondent sells in crates of 50 kg. The official kg number, also used by KACE's SMS service for market prices, is 64 kg.

The majority of the farmers interviewed explained that they prefer **selling** at the farm gate to traders who transport to Nairobi than to selling at the local markets. This is supported by Waiganjo et al. (2006), indicating that 75.8% of their farmers interviewed sold their produce at farm gate, 51.7% at local markets and at the roadside only 4.2%[19]. Intermediaries buy large amounts at a higher price than farmers are able to receive at the local markets. Selling to intermediaries is thus more profitable for them and provides them with security. At the local markets farmers sometimes have to sell in small units which increase the risk of not having sold everything in the evening.

Storing tomatoes is not common in Mwea Division. The majority of the farmers interviewed explained that this is due to a lack of adequate storage and cooling facilities that most farmers cannot afford. Furthermore, storing tomatoes is difficult because of their soft texture and high water content. The commodity spoils and rots very quickly. Farmers and traders complain that – especially in high supply season – they have to struggle with post harvest losses. But the hypothesis that **post-harvest losses** may be a major constraint for farmers could not be confirmed. On average (median) farmers only lose around 2 % of their seasonal yield. The given percentages range between 1% and 10%, which is surprising bearing in mind that tomatoes are a delicate vegetable, prone to diseases and hardly storable.

Reasons for waste are:

- tomatoes rot quickly after falling off the stem and lying on the earth due to rain and water.
- scorched by the sun,
- squashed at market in boxes, low quality ones are sometimes not sold,
- pest and diseases (e.g. pest caterpillars, parasitic wasps, bollworm, bugs)

Surprisingly, there is a public cooling and storage building in Mwea, managed by the Horticultural Crops Development Authority (HCDA), which is not in use. For further details see box 4.

[19] The total adds up to more than 100 %, because respondents could mention several market channels.

Box 4: The storing and cooling house in Mwea

In Mwea Division there is a cooling and storage building for fresh vegetables produced in the region. It is owned by the Ministry of Agriculture and under the administration of the Horticultural Crops Development Authority (HCDA). The building is equipped to store fresh, particularly export commodities (e.g. snow peas, French beans and flowers) in cooling facilities. The main objective was to help smallholders and farmers groups improve their business and thus the quality of the commodities. Originally built in 1998 its construction was overtaken by the rapid developments in the export industry, which now mainly stores directly in Nairobi at the airport. When the research team visited the storage facility it was completely empty and this situation – as the management affirmed – seems to be the rule rather than a temporary problem.

This is surprising because on the one hand tomato farmers lack an adequate facility to store their products to counterbalance seasonal oversupplies in the market. On the other hand the management claims that they would be open for smallholders in general and offer rates as low as 1 KSH/kg (open to negotiations, related to the quantities brought).

When asked why they do not use the facility the majority of the farmers replied that they associate it with very high prices (but at the same time they had to admit that their knowledge was based mostly on hearsay and that they did not know any exact numbers). Furthermore, farmers view it as the responsibility of the government to approach them, because the storage facility is public.

Storage house in Mwea
(Source:SLE-Team)

Farmers possess only little **information** about the **supply situation** at urban markets and the **demand** or consumer side, respectively. They cultivate according to their acreage and try to sell the total yield. Only farmers with access to irrigation are able to also grow in the dry season, where shortage of supply on markets results in higher prices. With regard to the quality expected of tomatoes, farmers stated that they know that the fruits have to be round, red and storable in the household. Sometimes farmers receive information about production aspects and market prices from the radio or mobile phone, provided that they own one. Those who also operate as traders and sell their harvest at local markets, inform themselves directly at the markets. The majority of producers though rely on information from stockists and seed suppliers. Even so, producers complain about possessing too little knowledge about e.g. prices at markets in Nairobi, so that traders are able to determine prices.

The **cooperation and organization level** of tomato farmers in Mwea is relatively low. Only a few farmer (self help) groups exist. Members are mainly small-scale farmers, who cultivate commonly different field and cash crops, e.g. maize, beans, peas. But the two farmers groups interviewed in Mwea (Mwituria Mamunyi self help group and Kangai water group) emphasised that tomatoes are always grown individually. Reasons are, firstly, the plot size required, which has to be relatively large to be profitable. Thus, nobody wants to offer land for common growing, because, secondly, the risks of harvest losses due to diseases and pests are very high compared to other crops. Both quantitative and qualitative data demonstrate that tomato farmers are mainly independent workers, who rely on their own skills. Trust and confidence is low between them. Hence, farmers only share information when there is an emergency, e.g. when new diseases appear, which they have to combat immediately. Furthermore, some persons stated that cooperation between tomato farmers is not necessary, explaining that farmers possess negotiating power due to direct contact with intermediaries, which permits them to influence the price. But farmers' opinion on this is not unanimous. As described in the previous paragraph, the majority complain about having too little negotiating power with intermediaries.

Relations between farmers and **brokers** or **intermediaries** are characterized by informality, as described in chapter 4.1.1. In addition, some interviewees judge brokers more positively. They emphasize the importance of brokers for farmers and explain that brokers are essential to both farmers and buyers, who alone would not be able to find and contact each other. Also, at a focus group discussion with small scale farmers in Kangai (Mwea Division) brokers are not ultimately viewed in such a bad light. This opinion is supported by KHDP. Researchers state that brokers provide important information and valuable service. They know what the market requires and even sometimes provide information to farmers concerning production or marketing issues (demanded varieties and quality).

Trade and Marketing Level

With regard to the **volume** of tomatoes traded from Mwea Division to wholesale and retail markets, the Agricultural Extension Officer from Mwea Division and several farmers state that approximately 70 % of the tomatoes produced are brought to markets in Nairobi, in particular grade 1 and 2.

One third of tomatoes produced in Mwea Division is sold at local markets. Those products are usually of lower quality.

The wholesale and retail market in Nairobi with the highest numbers of tomato wholesalers and retailers and the highest volume of tomatoes sold per day is the **Gikomba market**, described above (cp. 4.3.1). Around 800 tomato traders, i.e. wholesalers, intermediaries, brokers and retailers work there. The majority of tomatoes come from Kirinyaga district (Mwea Division). Only when there is dry season in the production areas of Kirinyaga District do traders also buy products from other regions like Loitokitok (25 %), Machakos and Tanzania (together 15 %) to satisfy the demand. Market officials of Gikomba Market state that volumes of traded tomatoes per day range from about 96 to 104 t. This corresponds with calculations based on the quantitative analysis and data provided from the Agricultural Extension Service in Mwea Division for the total ha of tomato production and average yield per ha in 2006.

Tomato wholesalers buy the products in wooden boxes of approximately 60 to 64 kg, either at the farm gate or directly from the farmer at the market. They resell it in these wooden boxes or in smaller crates of ~32 kg or buckets of ~7.5 kg to retailers or traders from Nairobi. Retailers usually buy tomatoes in plastic crates of 32 kg. They sell in buckets of ~7.5 kg or in little plastic bags of ~ 2 kg. There are only a few scales on the markets and the **units** used are hardly regulated or monitored by the market authority. Only retailers from local markets in Mwea Division cited regularly scale monitoring by the market authority.

Tomato crates of~32 kg in Mwea, Kenya
(Source: SLE-Team)

Box 5: Local markets in Mwea Division.

Local markets in Mwea Division

Every day in the week there are local wholesale and retail markets in different villages of Mwea Division. The markets' size depends on the number of wholesalers and retailers doing business there. The Market Authority from Kutus stated that there are around 100 tomato wholesalers and retailers per day. Due to a lack of space, the wholesale markets are sometimes located outside the central retail location, e.g. on the side of a little muddy street. But they officially belong to the markets. Wholesalers have to pay market fees for each unit of traded goods (see chapter 4.3.2.2).

The local wholesale markets take place from around seven to nine o'clock in the morning. The amount one wholesaler trades per day depends on his current cash situation and the supply situation at the market. Tomato wholesalers in Kutus said that they bought between 70 kg to 120 kg per day. The local retail markets start at around eight o'clock, but last all the day until the evening. When the wholesale market finishes wholesalers, who have not yet sold their products, move inside to the local retail market and work as retailers.

The infrastructure of the local markets is very poor. This was mentioned as the biggest constraint by the majority of the traders interviewed. Mostly, wholesalers and retailers sit on buckets or on the earth or just stand and sell their products. The commodities are placed in front of them, either on the ground or in different containers. There are only a few stands and few protective roofs against rain and sun, thus commodities spoil easily which minimises the traders' profit. Furthermore, working conditions are more difficult.

Large suppliers and supermarkets do play a minor role in the wholesale and retail tomato business. They cover only 1 – 2 % of all tomatoes sold, according to key resource persons. Supermarkets like Uchumi, as large-scale retailers, have constant but informal agreements with farmers that supply the company. In total, Uchumi has informal contracts with five large-scale farmers. Three of them cultivate in Mwea Division and supply 50 % of all tomatoes sold at Uchumi. The other two come from Kibwezi and Machakos. They supply Uchumi continuously, either with their own yield or with tomatoes purchased from different farmers.

The **institutional perspective** of the tomato VC trade and marketing level in Kenya shows an integration of many operators. Important ones for the trade are **brokers** and **intermediaries**. As described earlier, brokers provide their services at farm gate level and at market locations. Since they do not own the commodities and they do

not have to consider input costs, their risk of losing money is marginal. Several experts interviewed agreed in the assessment that brokers gain the highest profit of all operators from the Tomato VC in Kenya. Information and commodity transfer, i.e.the functions of a broker and a trader, can also be performed by one person. Some products find their way from farm level to wholesale and retail markets through only one or two hands. Sometimes brokers are not required, for example, when farmers sell directly to wholesalers or intermediaries team up with farmers and work as wholesalers at the markets, where they sell to retailers. Retailers either sell officially at a market or work as an illegal roadside seller, a kiosk seller or a hawker.

With regard to the **cooperation level** amongst the actors of the trade and marketing step, it was discovered that at least on Gikomba Market they are better organised than actors at production level. There are two organized groups:

The **Gikomba tomato traders** are organised into a self help group of tomato brokers and wholesalers. The director announced that the group has existed for more than 10 years, has about 500 members and is officially registered and the members meet occasionally. Membership fees have been abolished because some members could not afford them. The idea of establishing a group was to prevent outside traders from selling on the market. Those external traders have to pay a fee to be allowed to trade on Gikomba. Several traders explained that if external traders refuse to pay nobody will cooperate with them, so selling would be impossible.

Relations between cooperating brokers, wholesalers and retailers at Gikomba market are characterised by a high level of **trust**. The traders and retailers interviewed state that most business is carried out without cash, i.e. actors do not carry money with them on the markets in the morning. A wholesaler for example bargains a price with an intermediary (without paying). Then he/she supplies a retailer with the products without being paid directly. During the day the wholesaler collects the money from the retailers. The price has already been agreed upon in the morning. Finally, the wholesaler pays the intermediary. Trust is essential for this kind of cooperation. If someone abuses this trust and does not pay, the wholesalers stop selling to that person and inform other wholesalers as well as the police or city council. These have the power to prohibit traders from doing business on the market.

The **porters** at Gikomba market are also organised into a group since 2007. This was supported by the NGO Farm Concern International (see box 7). The objective is to improve their working conditions through identity and capacity building, and protection against pressure from the police. This also leads to a stronger position against clients like brokers, wholesalers, retailers and consumers,. Since being organised the porters attested to their increased bargaining power. At the beginning of 2007 for example they increased their payment from 20 KSH (0.29 USD) to 30

KSH (0.44 USD) per trip, although this is still very little (see chapter 4.1.3: livelihood analysis). The porters also pointed out that although on the one hand their situation had improved, they still had to face many problems, e. g. they do not possess any rights and are cheated by the police and the market officials. This is supported by the FCI representatives interviewed. Furthermore, the porters complained that it was still common for them not to be paid at all and thus be exploited by their clients.

4.3.2.2 Costs, Prices and Profits

Input and production level

Seed costs for Onyx, Cal J and Riogrande range between 720 – 960 KSH (10.59 – 14.12 USD) per kg. This is relatively cheap compared to the Valoria hybrid seeds, which cost 14000 KSH (205.88 USD) per kg. The researcher interviewed from KARI explained that although Valoria seeds have greater resistance to pests and diseases as well as higher yields, the majority of the farmers select the cheaper seeds. In making this decision they do not consider other necessary production costs (e.g. amount of fertilizer and pesticides), amount of yield and product quality. Total costs of input per season (including seeds, fertiliser, pesticides and technology such as irrigation) range between 1.33 and 1.39 KSH (0.02 USD) per kg of yield, of which fertilizer and pesticides account for a significant share of these costs. In both seasons, input costs remain almost the same.

In addition to input costs farmers also incur costs for workers on their fields. One worker is paid between 150 to 200 KSH (2.21 – 2.94 USD) per day, depending on season, work required (e.g. planting, harvesting, spraying) and working hours. Analyses of labour costs per season and acre result in median 26000 KSH (382 USD). These labour cots have the highest impact on the production costs.

The median of the total production costs of tomato farmers in Mwea Division is 0.11 USD per kg of produced yield in both seasons.

The selling price of tomatoes fluctuates widely between high und low supply season. It depends mainly on the supply situation at the markets, which is influenced by weather conditions (seasonality!) and diseases, leading to high yield losses and scarcity of supply. Demand is less important, as it seems to be constant during the year, with only a slight increase in holiday time. The following table 21 shows median selling prices in high and low supply season as well as costs and profits for farmers.

Table 21: Costs, prices and profits of Kenyan tomato farmers in 1st and 2nd season.

Figures on Production Level per kg (in USD)		1st Season	2nd Season
Costs (Median)		0.11	0.11
Selling prices	**Variation**	0.04 - 0.18	0.27 - 0.71
	Median	0.11	0.57
Profit (Median)		0.00	0.46

(Source: Quantitative survey of VC actors, own computation)

It is becoming obvious that farmers do not make any profit in high season, but make a large profit in low season when prices at the farm gate are high. However, it has to be taken into account that this applies only farmers with access to irrigation, who are able to cultivate in the drier season, when there is low supply at the markets. Other producers, especially small scale farmers, who live far from irrigation canals or do not have the financial basis to buy a pump, have to find an alternative source of income and thus cultivate crops that do not need irrigation (e.g. maize). In high supply producers sometimes are not able to sell their entire yield. Since storage possibilities are limited, the percentage of waste produce increases.

Trade Level

The following costs, prices and profits relating to the trade level are based on information from tomato traders at Gikomba and Wakulima markets in Nairobi, who mainly work as wholesalers and intermediaries. As described in chapter 4.1.2 (relations) brokers, wholesalers and intermediaries play an important role in the value chain for both farmers and retailers. Since they are well organised, their bargaining position is relatively strong, which is reflected in the purchasing and selling prices. Furthermore, they incur fewer costs and trade a high amount of goods in one season. Main costs mentioned by the traders interviewed are paid labour (carriers and cart drivers on the market), transport costs and market fees. Traders have to pay 25 KSH (0.37 USD) per day to enter the market and 100 KHS (1.47 USD) per crate of traded tomatoes. The latter costs are paid by intermediaries who deliver the tomatoes from the farmer. That means that costs for wholesalers who even do not possess a market stall and thus do not have to pay stall fees, are very low. Local wholesalers in Mwea Division who work at Kutus market have to pay 5 KSH (0.07 USD)/ crate of 32 kg. An overview of the buying and selling prices, costs and wholesalers profits is shown in table 22.

Table 22: Costs, prices and profits of Kenyan tomato intermediaries in high and low supply.

Figures on Trade Level per kg (in USD)		High Supply	Low Supply
Purchasing prices of wholesalers at markets	**Variation**	0.08 - 0.25	0.35 - 0.79
	Median	0.19	0.59
Costs (Median)		0.08	0.06
Selling prices of wholesalers on markets	**Variation**	0.21 - 0.53	0.37 - 0.87
	Median	0.31	0.74
Profit (Median)		0.04	0.09

(Source: Quantitative survey of VC actors, own computation)

In times of low supply the wholesalers' profit per kg is higher than in high supply, though purchasing prices at farm gate are already high. However, there is still a wide price margin from farm gate price to selling price at the wholesale markets. In high season wholesalers' profit is slightly lower, because the amount of goods traded rises as well as the number of trading wholesalers at the markets. Therefore competition between wholesalers increases and they depend more on brokers' knowledge to contact supply intermediaries as well as with demand retailers.

Marketing Level

The profit for market retailers mainly depends on purchasing and selling prices at the markets, which are determined by the supply situation. When there is an oversupply of tomatoes at the markets retailers have to sell at such a low price that they sometimes do not make a profit at all. Non-existent record-keeping makes the situation worse for retailers who do not know how high the daily income has to be in order to reach breakeven. Furthermore, it seems that in high supply retailers are not able to raise prices to the same extent as wholesalers, because wholesalers' bargaining power is greater whilst at the same time consumers' willingness to pay high prices in high supply is lower. Besides, it can be assumed that in high supply the percentage of products that retailers have to write off as waste is much higher than in low supply, although this was not confirmed by the persons interviewed.

During low supply retailers' work is more profitable. This is explained by the bigger margin between purchasing and selling price, although it should be taken into account that price information concerning selling prices might be unrealistic since they differ a lot from prices given by consumers.

Retailers' costs are divided into expenses for labour, transport, market fees and entrance as well as for rent of selling location. Market fees for retailers are the same

as for wholesalers (see above). Transport costs account for the largest share. The costs are more or less the same in both seasons.

Table 23 gives an overview of purchasing and retail selling prices, costs and the median profit for retailers.

Table 23: Costs, prices and profits of Kenyan tomato retailers in high and low supply.

Figures on Trade Level per kg (in USD)		High Supply	Low Supply
Purchasing prices	**Variation**	0.25 – 0.38	0.61 – 0.89
	Median	0.29	0.74
Costs (Median)		0.01	0.02
Selling prices of	**Variation**	0.28 – 0.42	0.74 – 1.18
	Median	0.32	0.88
Profit (Median)		0.02	0.12

(Source: Quantitative survey of VC actors, own computation)

Overview of profits of operators in the Tomato Value Chain in Kenya

Figure 14 gives an overview of the profits per kg of farmers, wholesalers and retailers in high and low season. This comparison shows clearly that in high supply wholesalers take the most out of the chain, while farmers profit in median is zero. They nevertheless continue to cultivate tomatoes in high supply to maintain business contacts with other VC actors, who are even more important in low supply. Retailers gain only half of the wholesalers profit per kg in high supply. In low supply this picture changes. Farmers, who are able to cultivate, are now in a good bargaining position because demand is higher than supply. The farm gate price rises while farmers' costs remain almost the same. Their profit per kg is extremely high compared to wholesalers and retailers. The analysis results show that wholesalers this time receive the smallest piece of the cake with respect to profit per kg. On the one hand this is understandable given the intense competition at the markets. But on the other hand competition between retailers is not weaker, since there are also as many retailers as possible on the markets and streets. Therefore, the higher profit per kg for retailers in low season can preferably be explained by unrealistic price information concerning selling prices when comparing prices given by retailers with prices given by consumers.

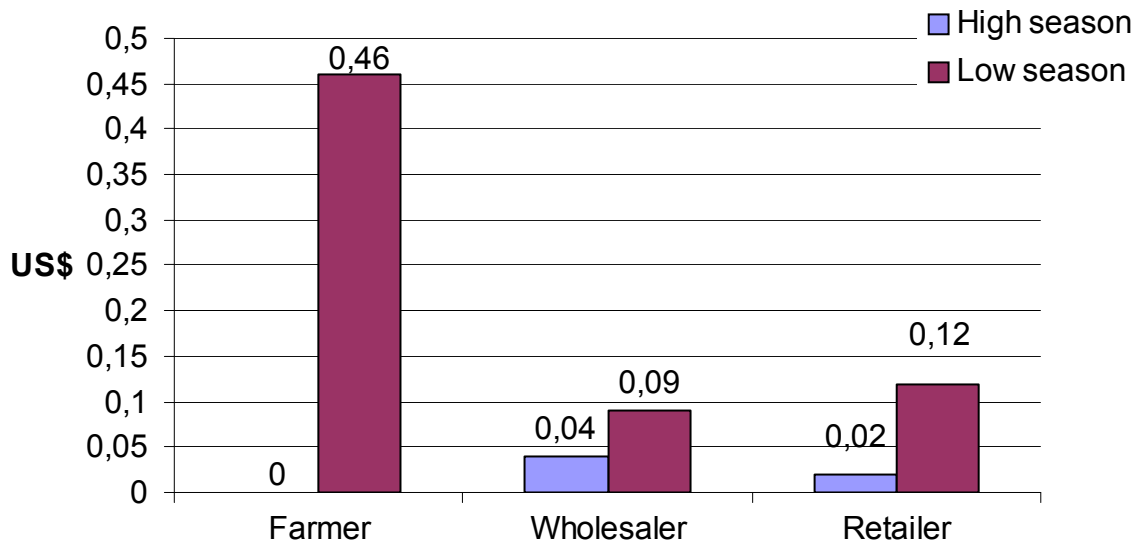

Fig. 14: Profit per kg in high and low season for farmers, wholesalers and retailers.
(Source: Quantitative survey of VC actors, own computation)

To appreciate the real profit distribution among the actors, it is necessary to also consider the volumes traded and thus examine the share of profit per season, which is shown in figure 15. Wholesalers trade high quantities, in median 10 to 15 times more per season than farmers and retailers. That means, that the profit per season for a wholesaler increases compared to farmers and retailers. In high season when wholesalers' profit per kg is already higher than the other actors, this unequal profit distribution is further accentuated. Wholesalers gain 99 % of the share of profit per season, in comparison retailers only 1 % and farmers in median do not make any profit, thus their profit share is zero.

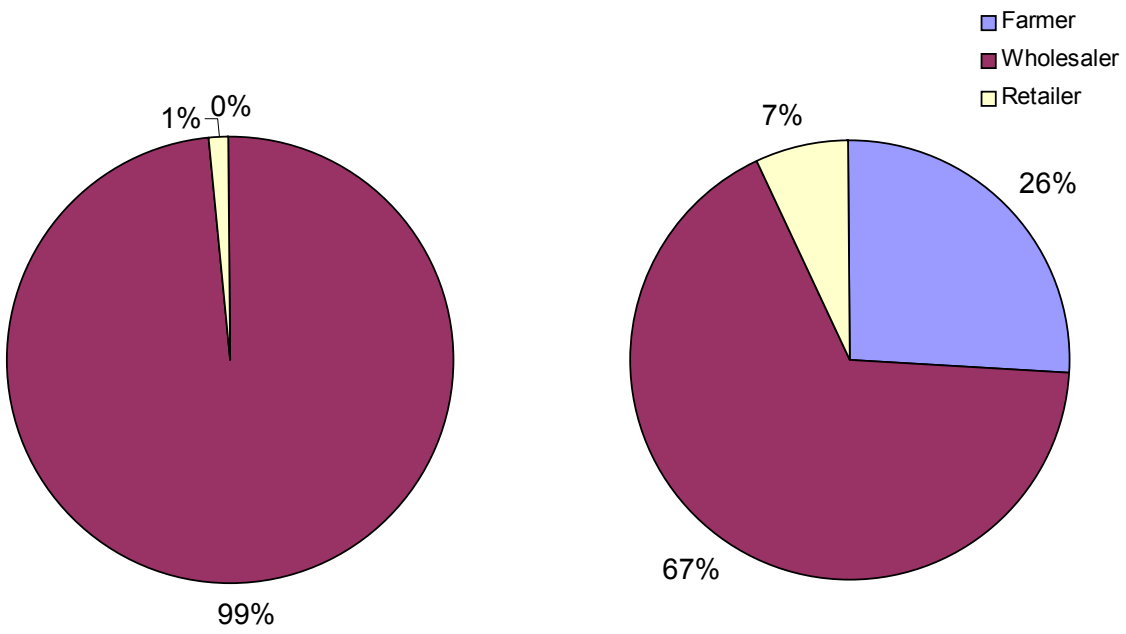

Fig. 15: Share of profit of different actor groups per season.
(Source: Quantitative survey of VC actors, own computation)

In low season again wholesalers are the ones who achieve the highest profit share (67 %) due to quantities traded. During this period farmers receive a very high profit per kg, which leads to a profit share of 26 %. Retailers gain 7 % in low season, though their profit per kg is higher than the wholesalers profit per kg. This is explained by the lower quantities traded per person. There are many more retailers on the markets than wholesalers. So they have to share the total volume of goods and thus the profit.

Box 6: The Technoserve Hub

Many producers face the problem of low power levels compared to traders due to their low level of organisation. Technoserve, a U.S. funded NGO active in Kenya, has developed an approach which they described as a “hub”. The hub is a bulking space/facility for fresh vegetables. It is owned by a farmer group. They exercise the function of a board but have employed a professional management. The hub buys the product from the farmers for a fair but market oriented price. It then retails the products again in larger bulks. Due to this concentration the hub possesses greater negotiating power and is able to command better prices.

Other NGOs/companies such as KACE apply a very similar concept with their regional trading centers.

Other possibilities for the hub exist. These would add value to the products such as washing, packing, storing and/or transport. Parts of the higher income could than be channelled back to the farmers.

4.3.3 Onions in Kenya

The following pages describe the value chain of onions in Kenya regarding the production areas and markets under consideration. After presenting the actors and detailed information on their activities and relations, the costs, prices and profit margins along the value chain are depicted.

4.3.3.1 The Actors, their Activities and Relations

Relevant information to understand the function of this value chain is introduced with regard to every value chain step. The actors and their relations are discussed following this structure.

Input Level

Kenya has 42 registered seed companies (locally owned and subsidiaries of international and South African companies), 26 of which are licensed to sell seed of vegetable crops (LENNÉ ET AL. 2005). Many input supply companies sell similar **seed** varieties in different qualities and for different prices, e.g. East Africa, Safari, Hygrotech, Simlaw. Common onion varieties the farmers interviewed cultivated in Kieni West are Red Comet, Red Bombay, and BSS.

One of the best yielding onion **varieties** in Kenya is BSS from the Netherlands supplied by Simlaw. 330 gram BSS seeds are enough to cultivate on 0.5 acre to harvest about 4,500-6,000 kg. The onions are medium-sized and they achieve a high price. Red Bombay variety is offered by a number of different seed companies. It is

low yielding and cheap. A tin of 500 gram is enough to plant on 0.5 acres. The yield is about 1,000-1,500 kg only. Red Bombay onions do not develop a nice red colour, are small and of poor quality. 250 gram of Red Comet seeds (from Seminice) produces about 3,000-4,000 kg of onions on 0.5 acre. Red Comet seeds are perceived to have a high quality. But the onions are big and therefore the price received from traders sometimes low[20].

Farmers buy seeds at local **input supply** shops. They reported that availability of inputs does not pose a problem, but the seed quality is not reliable. Conmen take advantage of the farmers' willingness to pay for high yielding seeds as a means towards improving their returns. Some shops sell fake seeds using the tins of high quality suppliers. Therefore, farmers often use different varieties in order to make sure that they have an output in case they bought fake seeds at their local stockist (LENNÉ ET AL. 2005).

Production Level

Onions are an important cash crop for farmers. In Kieni West mainly small-scale farmers produce onions in rainfed cultivation. They mostly grow onions in two **seasons**. The 1st season from April to August is when Kenyan onion farmers produce very little as a reaction to the high supply from Tanzania. The 2nd season from October to March is high season for them because then the supply of cheap Tanzanian high quality onions is low (tab. 24). Thus, the competition and market conditions are better for the Kenyan farmers. **Field sizes** of the producers interviewed range between 0.25 to 1 acres in the 1st season and they grow onions on more than twice as many acres in the 2nd season (0.75 to 2.5 acres).

Table 24: Season Calendar Onions in Kenya (Kieni West)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Short Rain			Long Rain							Short Rain	
Harvesting				Planting			Harvesting			Planting	
2nd season				1st season						2nd season	

(Source: Qualitative survey, own outline)

Median **yield** per acre in 1st season regarding the farmers interviewed in Kieni West is 4,500 kg and 5,400 kg in 2nd season. The difference in the average amount harvested can be due to favourable weather conditions but also because the farmers

[20] Information from FCI in Kieni West

care more for a high yield in that more lucrative period. In both seasons output lags behind the ideal yield indicated by seed companies. Apart from the influence of climate, reasons can be unadjusted application of chemicals and mixed use of varied seeds differing in quality and yield in order to avoid crop failure and in order to reduce costs.

In the 1st season **post harvest losses** range between 10 % and 80 % (median 15 %)[21]. Losses arise because of pest problems and bad weather conditions, but more importantly because farmers are not able to sell their produce in time. Most traders prefer Tanzanian onions in that season which are available at the same price but in a higher quality. Since only few farmers have special **storage** places with raised floors, most of them cannot bridge this period. The construction of a storage facility is too expensive, they report. With good storage facilities they could store the onions up to one month. Though it is likely that the onions would sprout (or even rot) if they were stored for a longer period because they are not cured properly and keep a lot of moisture. Thus, farmers try to sell the onions as fast as possible (within one week) even for a very low price as they reported in a focus group discussion (2 KSH = 0.03 USD per kg). In the 2nd season nearly the whole produce is sold (96 %) and only very little is wasted (3 %)[22].

Field workers packing unsold onions of the 1st season in Kieni West, Kenya
(Source: SLE-Team)

[21] Source: Own quantitative survey.
[22] Source: Own quantitative survey.

In dry season it is possible to store the onions in the field before harvesting. Some farmers stopped doing so because of unstable weather and unexpected rains causing onions to rot. From the farmers' perspective the advantage of storing in the field is that the onions do not lose weight and no additional costs for storage arise.

The most important criteria for farmers when choosing a **variety** for cultivation are high yield and good seed quality. Furthermore, farmers select varieties that are adapted to soil and climate, crucial for onion yield and quality. For example, in Charity, a village in Kieni West, the farmers cultivate Red Comet in Upper Charity and Red Bombay in Lower Charity due to the different soil and rain conditions. Demand and customers' preferences are only minor factors. Nevertheless, farmers are aware that traders from Mombasa prefer big onions like Red Comet. These traders sell to large hotels in Dubai. Local traders favour small onions which local people use for cooking in their household.

Frequent use of **fertiliser** is partly the reason why onions in Kieni West retain a lot of water and thus rot more quickly. This treatment makes curing more difficult. In order to convince farmers that a sensible application of fertiliser and pesticides in appropriate quantities and at specific stages in the production process is more useful, extension services and NGOs provide training for farmers. For example, FCI organised demonstrations of the positive effects of the correct use of less fertiliser.

Farmers stated that rates for **credits** are bad. Therefore, credits are unpopular. Farmers fear crop failure and not being able to repay the loan. Due to this uncertainity they prefer to depend on what they have. Although some saving groups exist that are open to everybody and not related to the cultivation of a certain product, SACCOS groups are still unpopular among farmers. When farmers take out loans they do not use them for farming but to pay school fees and other basic necessities. The practice of saving and reinvesting for agricultural purposes is not very widespread. If they use the credit for farming hey are not sure of making a profit. There are also no agricultural microfinance institutions active in Kieni West because of the farmers' lack of interest. Finance training seminars have been organised by FCI where microfinance providers are invited to present their products and their idea of microcredits. But farmers are still not taking advantage of them.

The farmers in Kieni West sell directly at farm gate. They do not go to the markets themselves. Transport is too expensive and too time consuming for them, they state. The level of cooperation in terms of bulking and transporting is quite low. That means they depend on transport organised by buyers. **Brokers** visit the farmers in their fields and tell them what quantity and quality they need. Farmers do not have fixed and formal contracts with traders or other buyers because they cannot guarantee to produce a certain quantity and quality every season. Consequently, regular

cooperation with the same brokers is very rare. They seldom have the opportunity to choose and to decide with whom they want to collaborate with. Thus, their negotiation power is very low because they do not have alternatives.

Farmers prefer to work on their own because decisions are easier to take without having to discuss it in a group. But some farmers are organised in **self-help groups**. They support each other in case someone is sick or for burials. Another common purpose of farmer groups is capacity building. Apart from working together on the common demonstration plot, they grow and sell individually. They do not even cooperate in order to improve their bargaining power by agreeing on one price for onions from their village. In order to get information about actual selling prices they usually contact their neighbours. Farmers mainly hire casual workers for their farm work during peak periods and mutual help among farmers is rare. The farmers all harvest at the same time, which results in a scarcity of casual workers.

Farm Concern International manages a project in Kieni West to support onion farmers on marketing issues (see box 7). Public extensionists are supporting those villages where FCI is not active.

Box 7: The Contribution of Farm Concern International

This Christian Regional Market Development Trust is developing pro-poor marketing models and strategic alliances to enhance economic growth among poor communities (FCI 2007). Their strategy to establish so called “Commercial Villages” has five pillars: 1. market research, 2. commercial villages, 3. capacity building and extension, 4. private sector partnerships, 5. market access and development. The approach goes beyond the farm gate. Three examples should be highlighted.

Commercial Villages

Commercial villages are already implemented in horticultural subsector, the export sector and livestock. In June 2006 FCI started a project with onion farmers in Kieni West and established five commercial villages. The objective is to link the farmers to the markets and to help them to become competitive. FCI offers training and capacity building, but no financial support. Training comprises record keeping, information on seed purchase and fertilisers, and market and demand oriented planning. FCI has partnerships with seed companies (e.g. Seminice) that demonstrate which seeds or varieties produce a better quality or a higher yield. FCI recommends that farmers should plant high quality instead of cheap varieties for increased yields.

Trader Groups

At Wakulima market FCI started a collaboration of trader groups with commercial villages in Kieni West in order to implement strong and reliable relationships. Furthermore, FCI links these trader groups to institutional customers, such as universities, schools or prisons. They supply these institutions and offer fixed prices. Aim is to empower the traders by upgrading their activities, since now they are also responsible for the delivery of the goods.

Porter Groups

Porter group development started only in summer 2007. The aim is to improve the situation of these service providers through identity and capacity building, and protection against pressure from the police because of their unrecognised status.

Trade Level

Most onions in Kenyan markets come from Tanzania mainly between June and November. During this time the Kenyan market is full of Tanzanian onions.

Kenyan onions come from Division Kieni West in District Nyeri North with a whole year round supply of onions and peak season from mid January to mid May when supply from Tanzania is low. Other significant sources in Kenya are Loitoktok (November – December), Isiolo and Maili Saba (January – July), Narok (November – March), Bungoma, Elgon, Taveta, and Kimana[23].

Wakulima is the major wholesale market for onions in Nairobi. Other wholesale and retail markets in Nairobi are supplied with onions from Wakulima. 80 to 100 tons of onions are traded on Wakulima every day. The market authority estimates that about 40 onion traders operate at the market. At **Gikomba** market about 12 tons of onions are traded per day, mainly via retail.

Onions from Tanzania are also directly sold in **Thika** market without having to pass through Nairobi and Wakulima wholesale market. This way, the traders do not have to pay charges to the NCC. Although Thika market is the main distributor of onions for the whole region (apart from Nairobi), only about 10 onion traders work at the new market.

Information from intermediaries indicates that they sell in median 10,500 kg per month in 1st season and 5,700 kg of onions in 2nd season. In order to show the variation of the **volumes** different traders sell, a different example of a wholesaler at Gikomba market is depicted. He trades 14 bags of around 116 kg (1624 kg) per month in high supply and 8 big bags (928 kg) in low supply. Because of high supply in 1st season and cheap purchasing costs, the amount traders sell in 1st season is twice as high as in 2nd season.

The **units** onions are sold in are big bags or in smaller nets. Officially bags carry 100 kg but in fact they usually contain 115-145 kg. The standard approved weight of nets is 14 kg but they generally hold 16 to 20 kg. Neither the nets nor the bags are weighed at any point on the market so that it is easy and profitable to cheat by using heavier bags and nets. The advantages of using nets in comparison to big bags are that they are lighter and therefore easier to carry; they are airy and thus more storable. Nevertheless, traders prefer trading with bags because loading nets is more time-consuming. Due to the fact that the market fee in some markets does not differ for big bags or smaller nets, traders are even more encouraged to use big bags. Furthermore, they believe that carriers who suffer from the strain of carrying heavy

[23] Informal information from FCI.

bags are not put at a disadvantage because they earn more when carrying the big bags.

Onion nets that have the correct weight of 14 kg are difficult to sell for the traders because it is common that nets are bigger than standardised. Hence, brokers urge farmers to fill more in the nets so that they can sell them at Wakulima market. But brokers do not pay more for these bigger nets than they would pay for a 14 kg net.

Most markets do not have proper **storage facilities**. But intermediaries and wholesalers state that they are able to store produce for a short period. Onions sometimes stay on a market for two weeks with no shelter when it is not raining. During cold weather or rain the traders incur **losses**. Traders who pack onions into nets at Wakulima market stated that they lose 1-2 %. Traders try to organise the packaging at farm level in order to sell the onions directly when arriving at the market.

Red onions are sorted into three grades. The first and best one is medium-sized. The second grade consists of big onions or twins. The rest is the third grade. In Kieni West the brokers usually organise **grading**. They arrange different prices for different grades, although they mostly buy the whole yield from a farmer. Another option is that the intermediary buys ungraded onions in big bags for one price, usually the average price of different grades. Then the onions are graded and repacked at the market place. Farmers do not grade for a number of reasons. On the one hand they do not have enough time during harvest; on the other hand they say the brokers would re-grade. Additionally, some do not know about the criteria applied. Apart from the brokers' knowledge on local farms and the crops grown there, this is why intermediaries cooperate with brokers. They do not trust the farmers on grading.

Traders participate in **groups** more often than farmers. They work together in trader groups on the market they are operating on. But they also take part in self-help groups where they support each other when someone is sick or dies. FCI fosters this development and organises traders and porters at Wakulima market (see box 7).

Frequently, traders at Wakulima market are in need of cash in order to pay the goods before reselling them to retailers. They borrow from **money lenders**, 1,000 KSH (14.71 USD) for a daily interest of 20 KSH (0.29 USD), i.e. 2 % per day, 64 % per month.

Onion Traders at Karatina Market, Kenya
(Source: SLE-Team)

Marketing Level

Representatives of the market authority estimate that about 100 onion **retailers** operate at Wakulima and as many work at Gikomba market.

In median the retailers interviewed sell a **volume** of about 1,800 kg per month in 1st season and 1,400 kg in a month of 2nd season. How much of the products the retailers have to throw away before selling is influenced by weather conditions, transport possibilities, and infrastructure. Retailers sometimes also incur **losses**, because they were cheated by sellers.

The **measuring units** retailers use when purchasing and selling the commodities often differs. They buy the onions from wholesalers in big bags or in nets. Most of them sell in small nets of one or two kg or per piece. Retailers also use weighing scales at the markets. The market authority checks once a year whether the scales are working properly.

Supermarkets are large-scale retailers, but only play a minor role in marketing FFV. Supermarkets like Uchumi have constant but informal agreements with farmers that supply the company. In total Uchumi has approximately 200 suppliers and all of them can provide onions. 60% of the onions sold in Uchumi are from Tanzania. Of the Kenyan onions sold in Uchumi 60% are from Nyeri District (Karatina), the rest is from Kibwezi, Loitoktok and the surroundings of Nairobi. Monthly Uchumi buys 22 tons of onions, selling it in the Uchumi branches in Nairobi. Each of the four hypermarkets sells on average 0.5 tons per week (2 tons per month). The smaller branches sell 0.25 tons of onions per week (1 ton per month).

4.3.3.2 Profit Margins along the Value Chain

This subchapter presents costs, prices and profits achieved at different levels of the value chain. Apart from qualitative information from expert interviews and focus-group discussions, quantitative data collected by means of the value chain questionnaires is analysed.

Input Level

BSS variety is expensive. It costs 8,400-9,000 KSH (123.53-132.35 USD) per kg. One kg of Red Comet is sold for 8,000-9,600 KSH (117.65-141.18 USD). The cheapest variety cultivated in Kieni West is Red Bombay. It is available for 1,800-2,000 KSH (26.47-29.41 USD) per kg. Seed costs are a bit higher than the costs for other inputs because FCI is promoting the cultivation of imported hybrid seeds in Kieni West in order to achieve a higher yield and a better quality.

Production Level

The onion farmers in Kieni West are more or less aware of their production costs. Expenses for labour have the highest impact on the production costs. The costs per kg of onions sold are higher in 1st season (0.11 USD) than in 2nd season (0.08 USD) (Tab. 25) due to pest problems and thus the need for more workers and pesticides. Weeding is also an important part of the costs. It is expensive and has to be done four times per season.

Table 25: Costs, prices and profits of Kenyan onion farmers in 1st and 2nd season

Figures on Production Level per kg (in USD)		1st Season	2nd Season
Costs (Median)		0.11	0.08
Selling prices	**Variation**	0.06 – 0.10	0.26 – 0.33
	Median	0.07	0.29
Profit (Median)		- 0.04	0.21

(Source: Quantitative survey of VC actors, own computation)

The fluctuation of selling prices between seasons is highest at production level. The price in 2nd season (0.29 USD) is more than four times as high as in 1st season (0.07 USD) when the supply and competition is high (Tab. 25). Subtracting the costs per kg of onions from the median selling price of a farmer the profit per kg on production level is calculated to be -0.04 USD in 1st season and 0.21 USD in 2nd season (Tab. 25). The average profit in 1st season is negative since the production costs are higher than the selling price. This information corresponds with the assumption that a lot of Kenyan onion farmers continue to produce in 1st season just to stay in the business.

They are aware that they do not profit from onion cultivation in these months. Therefore, most of the farmers in Kieni West need an alternative means of livelihood. As compensation the profit in 2nd season (0.21 USD) is very high. The amount Kenyan onion farmers sell in this season is about 2.5 times higher. This way the annual profit is positive. It still has to be kept in mind that the selling prices are not necessarily that high during the whole season but only for a few weeks in peak season.

Production costs form only one part of the total costs of delivering to the market place. They however are a major determinant of a region's competitiveness. Despite the high costs of produce delivery to market, regions with low production costs in most cases end up with the lowest total costs to the market. It is clear that there is a link between production costs and the competitiveness of a region (KAMAU 2001).

Trade Level

Regarding costs and prices it has to be differentiated between the different actors in the trade segment. Brokers, intermediaries and wholesalers have different costs and different prices and gain different profits. Table 26 only shows the costs, prices and profits per kg of onions for intermediaries. They have to pay the two brokers at production site and on markets, transport including the carriers, and fees for all goods brought to the market. In contrast, wholesalers do not have many expenses. They do not even have a market stall. Brokers also do not have any costs because they work on behalf of intermediaries.

Market fees to the city council, packaging nets, cess, loading, and off loading are other costs that have an impact on the traders' (particularly the intermediaries) business. Further factors can be costs for security, cleaning, border customs and tax.

Market fees vary depending on the city council imposing them. They range between 25 KSH (0.37 USD) per net of onions on Wakulima, 30 KSH (0.44 USD) on Gikomba, 10 KSH (0.15 USD) in Thika and Karatina. In Gikomba the fee per bag of onions is 175 KSH (2.57 USD). Consequently, with regard to the market fee it is more profitable to trade in bags than in nets.

Table 26: Costs, prices and profits of Kenyan onion intermediaries in 1st and 2nd season

Figures on Trade Level per kg (in USD)		1st Season	2nd Season
Purchasing prices of intermediaries at farm level	Variation	0.06 – 0.10	0.22 – 0.44
	Median	0.09	0.37
Costs (Median)		0.05	0.06
Selling prices of intermediaries on markets	Variation	0.12 – 0.25	0.42 – 0.74
	Median	0.17	0.48
Profit (Median)		0.03	0.05

(Source: Quantitative survey of VC actors, own computation)

Wholesalers' median price at Wakulima who buy from the intermediary is a lot higher than the price that the intermediary pays at farm level. This is due to the fact that the intermediary has to compensate his high expenses for brokers, transport, and market fee.

The intermediary realises only a small profit per kg in 1st season because of the high competition at that time. In 1st season he also depends more on brokers than in 2nd season who he also has to pay. In times of low supply the intermediary's profit per kg is higher, so that his return is high although the quantity sold is lower. Only brokers profit more in the 1st season because their support is requested when supply is high. In that period, it is difficult for intermediaries to find a wholesaler who wants to buy their products because of the high onion supply.

Marketing Level

Retailers' costs do not change a lot during seasons. Their profit depends mostly on purchasing and selling prices. An assumption as to why the margin in low supply is a bit lower than in high supply is that retailers do not pass the whole price fluctuation on to consumers because they might buy less if the price is too high.

The retailers' costs consist mainly of the market fee and transport costs from wholesale market to their selling place. Retailers operating on a market have to pay a daily market fee. In Wakulima it accounts for 25 KSH (0.37 USD), in Karatina only 10 KSH (0.15 USD). Sometimes retailers also have to pay for storage.

The median profit per kg of retailers does not differ a lot between 1st and 2nd season (Tab. 27).

Table 27: Costs, prices and profits of Kenyan onion retailers in 1st and 2nd season

Figures on Trade Level per kg (in USD)		1st Season	2nd Season
Purchasing prices	Variation	0.23 – 0.38	0.61 – 0.89
	Median	0.31	0.74
Costs (Median)		0.02	0.02
Selling prices of	Variation	0.32 – 0.74	0.74 – 1.18
	Median	0.42	0.84
Profit (Median)		0.09	0.08

(Source: Quantitative survey of VC actors, own computation)

Uchumi supermarket buys onions during high supply for 25-30 KSH (0.37-0.44 USD) per kg and sell on average for 49 KSH (0.72 USD). During low supply one kg is bought for 65 KSH (0.96 USD) and costs 85-90 KSH (1.25-1.32 USD). In consequence, Uchumi has a margin of about 22 KSH (0.32 USD) per kg in every season to cover expenses. Uchumi representatives state that the company has a profit of 25-30% when selling onions.

In a Zucchini Grocehouse shop the price for one kg of onions during high supply ranges between 49-59 KSH (0.72-0.87 USD), thus being at the upper end of the selling price margin.

Transport

Transport costs are high due to bad roads and infrastructure. This influences the end price. Transport costs are particularly high in 1st season. Since more onions are traded, more transport is needed. The same applies for labour costs for carriers. Furthermore, the prices of porters on production sites are higher than on markets.

Porters always negotiate prices according to the amount of trips they expect to do, the bags' size, the distance and the amount of bags. Porters at Gikomba get 30-50 KSH (0.44-0.74 USD) per net and trip on the market and 50-100 KSH (0.74-1.47 USD) for transporting a net from Wakulima to Gikomba. A handcart carries up to 20 nets. On average a handcart driver has two to five trips per day. One handcart driver reports to have an average income of 500-1000 KSH (7.35-14.71 USD) per day.

Consumption Level

Table 28: Purchasing prices of Kenyan onion consumers in 1st and 2nd season

Figures on Trade Level per kg (in USD)		1st Season	2nd Season
Purchasing prices	Variation	0.25 – 0.74	0.50 – 1.10
	Median	0.58	0.88

(Source: Quantitative survey of VC actors, own computation)

The median end price consumers pay in 1st season is 39 KSH (0.58 USD) though the variation is high. During low supply a kg of onions costs 60 KSH (0.88 USD) for the consumer with a variation of 0.50 to 1.10 USD. The price fluctuation over the whole year for the consumer is less than it is for the farmer.

Overview on Profits of Actors in Onion Value Chain

In the figure below the median profit per kg of onions for farmers, intermediaries and retailers dealing with onions in Kenya is shown for 1st and 2nd season. In order to be able to interpret this information correctly, it has to be viewed in combination with the volumes each actor trades, so that their actual profit per month becomes clear.

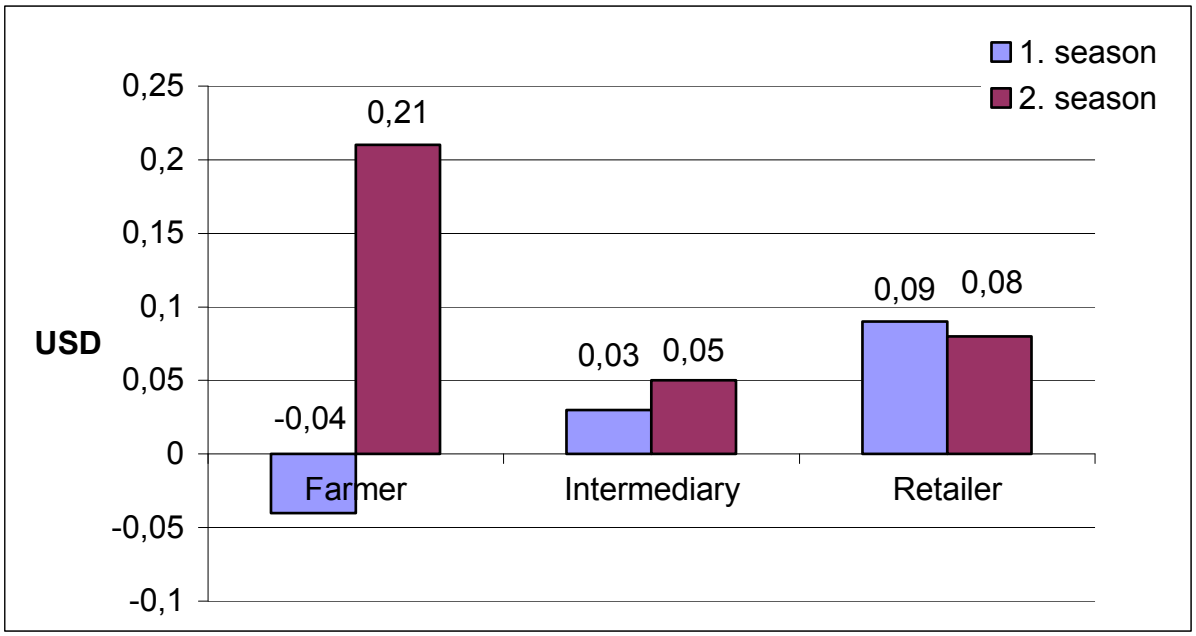

Fig. 16: Median profit per kg of onions for different actor groups
(Source: Quantitative survey of VC actors, own computation)

The volumes of onions traded differ depending on the various actor groups. Farmers sell smallest quantity, since they only have the yield from their plot. Intermediaries

and wholesalers trade the highest volumes in the value chain, sometimes buying the whole yield of one farmer in a week. Retailers also sell more than a farmer per season, but four to six times less than a trader.

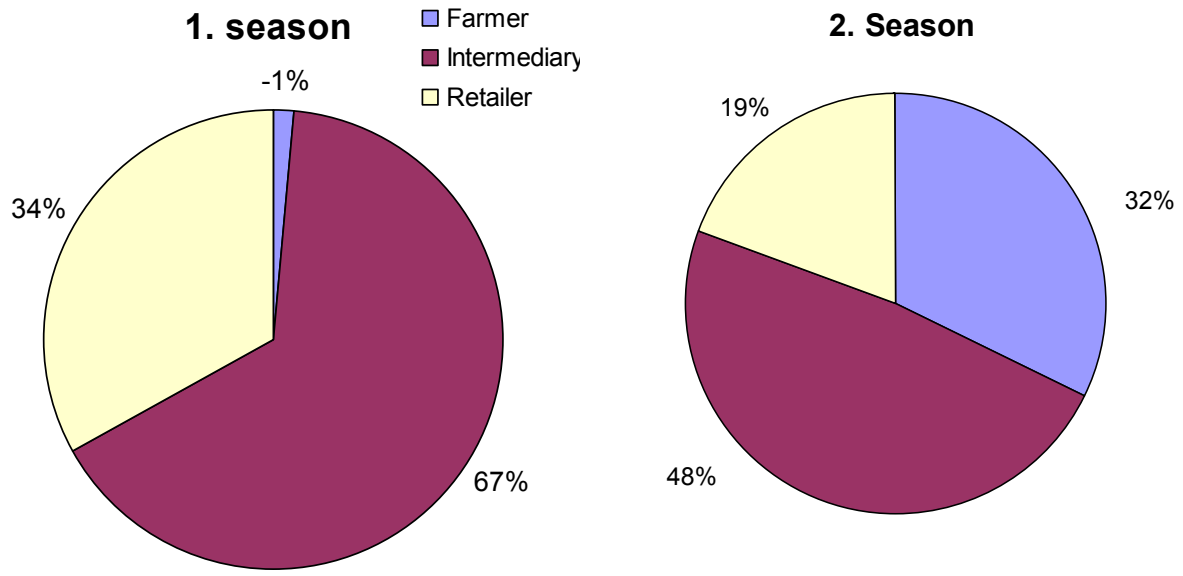

Fig. 17: Share of profit of different actor groups per season.
(Source: Quantitative survey of VC actors, own computation)

Since in the 1st season most actors make no or very little profit per kg, the intemediaries have the biggest share of profit due to the high quantity they trade (Fig. 17), farmers make an economic loss.

In 2nd season the farmer still has a lower share of profit than the intermediary although his profit per kg is the highest. This can be explained by the lower quantity a farmer produces and sells.

4.4 Constraints and Potentials in the Value Chains

Previous descriptions of value chains in Kenya and Tanzania have revealed the many different opportunities and bottlenecks at the different VC steps. In the following pages these aspects, mainly based on the study team's data collection, are summarised.

Since most of the constraints concern more than one actor group or one VC level, this chapter deals with three groups of constraints and potentials: firstly, potentials related to legal regulation, fees and taxes; secondly, bottlenecks concerning value chain governance, information flow, and distribution of profits and trust; and thirdly, those issues relating to infrastructure, technology, inputs and health.

1) Constraints and Potentials Related to Legal Regulations, Fees and Taxes

The high fees charged by city councils at markets pose a problem to VC actors. Market fees are not used for maintenance, cleaning, water, and electricity. Traders and retailers rarely profit from any services.

Market regulations are poorly enforced. Standards concerning measurement units, labour conditions and limitations of pesticide residues do not exist or are not enforced. There is also no demand for these standards, either from the producer or from consumers. A particular issue are the measurement units that not only vary amongst the two countries but also within. Different sizes of onion bags or nets and tomato crates are used, since the market authority does not weigh any of the measurement units at any point. But charges are paid per unit. Usually, traders try to enlarge the measurement units, thus cheating the city council, putting farmers at a disadvantage, and compelling porters to carry far too heavy bags.

In Nairobi, the NCC is limiting wholesale on Gikomba market by clearing the place every morning at 8 am (see 4.4.1). The traders need a proper market place for wholesale. They would like the NCC to offer a place in Gikomba area so that they can stay where consumers and business partners can reach them easily and where different products, not only fresh goods, are sold as in the case of Wakulima market.

Actors operating in a semi-legal environment such as handcart drivers, carriers and hawkers are most affected by legal regulations. They are defenceless against punishment (financial and physical) by the police or other authorities. They also often double-crossed by clients.

Since hawkers do not pay any market fees, but often sell on or near the market places, the authorities chase them away or confiscate their goods. They therefore have to keep constantly on the move, which sometimes makes it hard for them to attract customers.

A problem reported by handcart and lorry drivers is the ban on using specific roads or parking places for their vehicles. Since parking places on markets are often lacking, lorry drivers use public parking sites nearby. Carriers are sometimes charged when unloading trucks at these car parks. Irregular fines are sometimes as high as the daily income of a porter. Lorry drivers report bribes which they have to pay at road blocks to police officers. These bribes seem to be so regular and not open to negations that the transporters have already taken account of them in the budget for their trips[24].

[24] HOEFFLER AND MAINGI (2004) discuss a similar phenomenon for the Kenyan potato traders/ transporters leading to the assumption that such corruption/ overtaxing is widespread.

Cess is another restriction related to legal regulation. It has to be paid when transporting a commodity over district boundaries. If and how much is raised is subject to the decision of each district council. The income from the cess flows directly into the city councils' central treasury and does not remain on the market. I.e. there is no direct link between the sum paid and any service offered by the councils.

2) Constraints and Potentials Related to Value Chain Governance

The biggest issue for most actors is marketing of onions and tomatoes. Farmers sometimes do not have enough selling opportunities in 1st season and are forced to sell at a loss. Since prices fluctuate substantially from season to season or even within a day, planning is very difficult. The actors have to take measures to counter the meagre income during high supply.

Cooperation among all VCs actors is very weak. Building smallholder groups or contract farming, solutions promoted by development cooperation, were often neglected by the VC actors. Not only, but especially farmers prefer to operate individually. They only help each other in times of social or family problems. They argue that cultivation carries a high risk which is better shouldered individually, since in their opinion the distribution of profits and losses would be difficult. Farmers also prefer to have the chance of earning a high surplus during low supply instead of receiving a stable price throughout the whole year. The positive effects of cooperation can be proved by the example of intermediaries on the Kilombero wholesale market. They have formed a saving and credit group (SACCOS, see box 2) which reduces individual risk and might foster collaboration also in other aspects.

As relationships of trust are rarely established between farmers and traders, intermediaries rely on brokers who know their requirements. A reason for the lack of trust is the irregularity of business relations. They only contact each other during harvest time so that the intervals are long. It would be easier for traders to collaborate with farmers directly if the farmers would partly perform the function of a broker and do the grading or organise the bulking. FCI is working with onion farmer and trader groups in Kieni West and Wakulima market in order to improve cooperation in the value chain (see box 7: Farm Concern International).

Another bottleneck especially for farmers is lack of market intelligence. Many of them have a rather limited insight into demand and prices at the market as they have little understanding about costs emerging further along the value chain. Most farmers receive price information from fellow farmers or brokers whose interest to manipulate might be high. In some regions farmers themselves engage in transport and trade (see 4.2.2.1). They catch up on market prices, hire trucks and transport their goods to the markets. Their market intelligence level and therefore their bargaining position and profits are relatively high compared to other farmers. A second good example

regarding distribution of market information is provided by the Kenya Agricultural Commodity Exchange (KACE), located in Nairobi. KACE is a private company delivering market information on agricultural commodities in various regions. Staff members catch up on market prices and trends to sell this information via Internet, mobile phones or by phone to many actors along the value chain.

Liquidity constraint is a problem to all actors. This especially affects the farmers who must afford high financial input at a certain time. Their cash constraints lead to a dependency on input suppliers, brokers or other actors who offer credits. Furthermore, they do not have capital for new investments like storage facilities.

Most actors have no or limited access to credits. While Equity Bank (Kenya) and others provide credit lines for low interest rates to smallholders, a lot of the farmers have an aversion to taking credits. Due to fluctuating prices and variable yield they are not sure whether they would be able to repay the loan in time. As the bank and SACCOS offer possibilities to repay loans at a later date if the harvest fails, it would appear that credits present an opportunity, about which the farmers need more accurate information.

Access to markets is an important issue in the VCs. Not all actors operate freely on the markets. Although officially the market authorities claim that there are no restrictions, in reality traders on the markets control who enters the business. The access to Kilombero (Arusha, Tanzania) and Gikomba (Nairobi, Kenya) market is de facto in the hand of small cartels of brokers and intermediaries. Farmers and traders not approved by the wholesale associations have virtually no access to the markets. It seems that a clear enforcement of the law permitting free entrance to the markets is required.

The clients' failure to pay is a problem for different VC actors, but mainly for porters (i.e. handcart drivers and carriers). Since the business agreements are non-contractual spot-market relations and particularly the porters' lack of negotiating power, other operators, e.g. traders or retailers, seem to exploit the absence of written contracts. Porters prefer not to set fixed prices among their group members because they are afraid to limit their potential profit in doing so.

3) Constraints and Potentials Related to Infrastructure, Technology, Inputs and Health

Missing or weak infrastructure hampers development. The infrastructural problems in the production regions are evident. Erosion has created enormous holes in the roads, reducing non-four-wheel drive vehicles to a minimum speed. The construction of an all year round usable (tarmac) road would enable farmers to reach markets with their own means of transport or by public means of transport. Spoilage of the produce as a

result of the bad road conditions would be reduced, as would the problems which traders and transporters face when trucks get stuck for several days during the rainy season. This would lead to an overall reduction in transport costs as more actors would possess the technical means to access the road. It is possible that the flow of information from the market to the farm region would improve in speed and accessibility.

Infrastructure and services are lacking on many markets. Traders and retailers do not have enough space for their business, meaning stalls, storage facilities and parking spaces for trucks. Selling areas e.g. in Gikomba and Thika (Kenya) are muddy, have no roof and sanitary facilities. Poor protection against rain and sun are problems for retailers who incur wastage when onions or tomatoes spoil before they are able to sell them on markets. Waste can also be caused by improper packaging of the goods during transport. Market authorities are not in a position to provide better services due to a lack of coordination, resources and staff. An example of the benefits of a good infrastructure is the Kilombero wholesale market in Arusha that was rebuilt in 2006.

Infrastructure at Gikomba Market, Kenya
(Source: SLE-Team)

Unstable weather conditions pose further problems for farmers cultivating without irrigation schemes, as in Kieni West. They are always at risk of not achieving a good harvest.

Storage facilities offer farmers the potential to react more flexibly to market supply and thus prices. Onion farmers in Mang'ola, Tanzania, already take advantage of this

opportunity and do not have to sell their produce all at once. Besides the high construction costs of storage a further constraint is the perishableness of the crops. For example, Kenyan onions tend to rot quickly because of insufficient curing and tomatoes need cold storage houses. This leads to the situation that all operators in the VC need to sell the commodities as fast as possible.

In Kenya, smallholders' needs for productive and adapted vegetable varieties are not currently being met by the local subsector. Seed quality and reliable suppliers are still a problem at production level. National regulation outlaws seed multiplication by farmers for commercial purposes. They have to purchase seeds each season incurring high input costs, particularly in Kenya. In Tanzania seed regulation differs: local seed breeding is officially supported in order to reduce input costs at farm level and to provide locally adapted varieties.

Quality is an important issue in the value chain of onions in Kenya. Kenyan onion farmers have a competitive disadvantage in comparison to Tanzanian farmers, unless the quality can be improved with reasonable effort. Due to frequent and probably inadequate use of fertiliser in Kenya the stem of the onions is thicker. Thus, curing takes longer and farmers often cut the onions too early when they are still wet. This leads to higher perishableness. Farmers also do not take enough time for curing because they fear unexpected rain fall and that the onions could rot in the fields. Either the production process can be enhanced and costs reduced or the farmers have to consider alternatives. FCI proposes beans or African indigenous vegetables as alternatives for onion farmers.

Kenyan onion farmers report a scarcity of labour during planting and harvesting because most actors plant at the same time in order to achieve the best yield. Access to irrigation schemes and improved coordination among the farmers might be helpful in solving this issue. It could lead to a less competitive situation on the market when the farmers would not have to sell all their produce at the same time.

Major constraints mainly cited by tomato farmers were diseases, pests and high costs for chemicals to combat them.

The following table summarises the constraints and potentials mentioned.

Table 29: Constraints and Potentials in the Value Chains

1) Constraints and Potentials Related to Legal Regulations, Fees and Taxes		
Operators	**Constraint**	**Potential**
Traders, retailers	High charges of city councils at markets	Provision of services using market fee revenue
All actors	Standards concerning measurement units, labour conditions and limitations of pesticide residues do not exist or are not enforced.	Control weight/ size of measurement units
Hawkers, porters	Exposure to financial and physical punishment from police, other authorities or clients due to illegal status	
Transporters	Lack of parking sites at markets	
Transporters	Payment of irregular fines or bribes	
Traders, transporters	Cess collection at district boundaries	
2) Constraints and Potentials Related to Value Chain Governance		
Operators	**Constraint**	**Potential**
Farmers	High supply and very low prices during 1st season	Construction of storage facilities → Enable farmers to react flexibly to market supply and prices, e.g. onion farmers in Mang'ola, Tanzania
All actors	Weak cooperation	Fostering smallholder self-help groups and SACCOS
Farmers, traders	No trustful relationship	Linking onion farmers and traders by FCI
Farmers	Lack of information on market prices	Distribution of market information on agricultural commodities provided by KACE
All actors	Liquidity constraint → Dependency on input suppliers, brokers or other actors who offer credits	
All actors	Limited access to credits	Smallholders need more accurate information on credit lines for low interest rates by Equity Bank and SACCOS
Traders, retailers, farmers	Access to markets: Traders on the markets control who enters the business.	Clear enforcement of the law that permits free entrance to the markets
Porters	Client payment failure	

3) Constraints and Potentials Related to Infrastructure, Technology, Inputs and Health		
Operators	**Constraint**	**Potential**
Farmers, traders, transporters	Bad infrastructure in the production regions	Construction of an all year usable (tarmac) road → Enable farmers to reach markets using own or public means of transport → Less product spoilage due to bad road conditions → Overall reduction of transport costs
Traders, retailers	Lack of infrastructure and services on markets: lack of space, storage facilities and parking places, bad hygienic situation	Improvement of infrastructure on markets, e.g. Kilombero wholesale market in Arusha → Reduced waste due to shelter
Farmers	Inconstant weather conditions	Irrigation schemes
Farmers	High construction costs of storage facilities	
Kenyan onion farmers	Limited access to arable land and high prices for renting plots	
Kenyan onion farmers	Lack of productive and adapted onion varieties Varying seed quality and unreliable suppliers High input costs	Support local seed breeding → Reduced input costs → Provision of locally adapted varieties, e.g. Tanzania
Kenyan onion farmers	Bad quality and high perishability of Kenyan onions	Enhancement of production process Reduction of production costs Alternative crops for cultivation
Kenyan onion farmers	Lack of labour during planting and harvesting	Access to irrigation schemes Better coordination among the farmers
Tomato farmers	Diseases, pests and high costs for chemicals to combat them	

(Source: Own outline)

5 A new Point on the Map – Understanding Cross-Border Trade

Typically a value chain analysis is related to a domestic or an export market in terms of overseas destination. This chapter deals with something different: cross-border trade (CBT) goes beyond domestic market boundaries but is less than export business. Tanzania and Kenya are Partner States of the East African Community (EAC); therefore, this particular regional trade will be reviewed within this political framework.

5.1 The Role of the East African Community and the Customs Union for Cross-border Trade of Fresh Vegetables

Onions play an important role in cross-border trade of horticultural products. More than 50% of the onions consumed in Kenya are from Tanzania. More than 80% of the eight to ten tons of onions traded per day at the Wakulima market in Nairobi are from Tanzania as well. The tomatoes traded from Tanzania to Kenya come mainly from the Iringa and Morogoro regions and flow to Kenya's coastal areas. Both regions do not belong to the research areas. In comparison, onions produced in Northern Tanzania posses an important share of the total amount of Tanzanian onions consumed in Kenya.

The Karatu District (detailed description, see chapter 4.2) is one of the major onion production areas in Tanzania and at the same time is of crucial importance for the onion related CBT. These crops are traded to Nairobi and other markets throughout the Kenyan Central Province. Generally, there are two different ways for the CBT: either Karatu – Arusha – Nairobi, or Karatu – Nairobi. Both will be described below.

Onions for the cross-border trade in Karatu, Tanzania
(Source: SLE-Team)

The East African Community started to simplify regional trade within the community by implementing the Customs Union in 2005 targeted to establish a common market in the year 2010[25] (STAHL 2005). There is a strong belief that boosting regional trade in Sub-Sahara Africa could increase economic growth and contribute to poverty reduction. Article 75 of the Treaty for the Establishment of the East African Union regulates the elimination of all tariffs (including taxes and duties other than those that exist for the same domestic product) and non-tariff barriers as well as the harmonisation of trade documentations and procedures. However it is questionable how big the impact from the abandoned tariffs can be in the case of tomatoes and onions. STAHL notes that the overall intra-communal trade between Tanzania and Kenya is not that high and asymmetrical among the member states (2005: 16-32). Also most of the pre-CU tariffs were already low. He therefore estimates that only a modest impact on trade is likely and that the gains will not be passed on to the consumers but rather add to the traders' profits (IBID.: 32). The impact of the abolition of non-tariff barriers might be much higher, given the fact that many problems relating to trade among EAC member states arise from non enabling policies, corruption, and also custom and transit procedures (IBID.: 54).

While the customs union is in place and in the case of tomatoes and onions no transition rules were agreed upon, other parts of the treaty which are not yet in effect do influence the trade. Article 90 regulating road and road transport speaks of a harmonisation of gross weight and load of vehicles which is not realised yet. Other articles concern the creation of a private seed multiplication sector (Art. 106-f), the adoption of common rules on agricultural chemicals (Art. 107-e), pest control (art. 107-a), phyto-sanitary inspections (Art. 107-c) and establishment of a food security assessment mechanism including a market price information system (Art. 110) (EAC SECRETARIAT: 61-80).

Article 4 §2-b of the Protocol on the Establishment of the East African Community Customs Union also states that adopting a common standard system for the valuation of goods is planned.

5.2 Actors along the Cross-border Trade Value Chain

There are many actors involved in the governance of this particular value chain. A few of them are only involved in CBT (clearing agents and the authorities at the border), others try to increase their profits, because they realise higher profits through CBT (mainly farmers, traders, wholesalers and transporters), some of the

[25] Recently Rwanda and Burundi joined the union and will be integrated into the contractual framework.

actors are involved for no specific reason. These are basically porters and retailers who deal with the commodities which are on the market. Consumers finally have some influence on the market. They demand Mang'ola onions for quality reasons.

Table 30: Actors involved in Cross-border Trade

Actors only involved in CBT	Actors involved in domestic trade and CBT (because of higher profits)	Actors involved in CBT without specific reasons
	1. Farmers	1. Porters Karatu district
	2. Brokers Karatu	
3. Transporters	3. Transporters	
	4. Traders at Kilombero	4. Porters Kilombero
	5. Traders from Nairobi	
	6. Transporters	
7 Namanga Border Crossing 7a Clearing Agents 7b Border Authorities		
	8. Brokers Wakulima	
	9. Wholesalers Wakulima	9. Porter Wakulima

(Source: own computation)

When examining the CBT from Northern Tanzania to Kenya two main value chains must be differentiated. Without taking into consideration where the onions will be consumed in Kenya it is obvious that the main difference is whether the onions pass through Kilombero wholesale market in Arusha or not. Farmers in Gorofani and traders from Wakulima market describe the Kilombero traders association as a powerful organisation in CBT.

1. Farmers involved in CBT (the following numbering refers to the indicated in the table above)

Farmers and farm workers at production level are described in detail above (see chapter 4.3). In terms of CBT, the chain's analysis starts at the farm gate. Compared to onions for the Tanzanian market, some farmers pack the crops into nets of the size required at Kenyan markets (14 kg) and at the same time they sort the crops according to grades, while the onions for the local/ national market are packed into bags. Both activities add value to the product; the farmers in return receive a better price at farm gate. Some farmers also manage transportation and trading to Wakulima market on their own. They accumulate most of the profit because they cover nearly all steps of the value chain.

2. Brokers at Mang'ola in Karatu District

There are two types of brokers at Karatu district. They are likewise explained in chapter 4.3.

1., 2., 3., 4., 5. Inter-linkages of Karatu producers and Kenyan traders

Government officials in Karatu blame the Kenyan traders for buying at the farm gate and offering dumping prices. Recently the Karatu district officer wrote a note forbidding Kenyan traders from going to Baray and Mang'ola ward to protect Tanzanian farmers against Kenyan traders. Even though some of the Tanzanian farmers and brokers directly involved in CBT judge CBT completely differently: They prefer to deal with traders from Wakulima market directly. Kenyan traders pay higher prices than Tanzanian traders from Kilombero. Furthermore, farmers prefer selling to them, because they receive payment with a delay of up to six weeks if they sell to Kilombero.

Already in 2002 riots occurred in Karatu. Traders from Wakulima were the target of violence and robberies. The traders and brokers of the Kilombero traders association are accused of doing as much harm to Kenyan traders as possible.

Independently farmers, brokers and key resource persons explained that the conflict has two sources:

- The Karatu district is ruled by the Chama Cha Mapinduzi (Revolutionary State Party, CCM), like many of the villages in Karatu district. In Gorofani, which seems to be the only village directly dealing with Kenyans, the ruling party is the opposition Chandema party. Nobody could say when the CCM started to be in favour of the Kilombero traders but according to the traders it is at least since 2002, when the riots occurred.
- The other reason is that the Kilombero traders association firmly controls the whole market and tries to trade all onions from Karatu district through their wholesale market.

3. and 6. Transporters

Traders and farmers involved in CBT from Northern Tanzania to Kenya have to rent the trucks from transportation-entrepreneurs, who hire them out with driver for transportation. Small-scale transporters do not play a specific role in CBT.

4. Traders and Porters at Kilombero

Most of the onions produced in Karatu district are traded through Kilombero. This market, its traders and porters are already described and analysed in chapter 4.3.1. Herein, only the role of the traders beyond their functions in the domestic Tanzanian

onion value chain will be explained. Both types of trader, those who buy through Kilombero and those dealing in Karatu district, stated that the traders and brokers of Kilombero Market in Arusha protect themselves strongly against traders from other areas and especially against traders from Kenya.

Box 8. Kilombero Monopoly

Every trader involved in CBT is forced to buy Mang' ola onions at Kilombero wholesale market. The Kenyan traders who deal directly with Mang'ola farmers cannot transport their goods through Arusha. When they change the means of transportation to go to Kenya, they have to do the loading and unloading somewhere outside Arusha. One trader changes the trucks in the night hidden in a coffee estate outside Arusha. They hide from the police and the Kilombero traders. Traders buying directly in Arusha, who do not pass through the bottleneck of Kilombero would get into trouble by the police. The strong relationship of the Kilombero traders to the police would lead the police to say that the Kenyan traders are smuggling drugs. Kenyan traders dealing in onions and bypassing Kilombero hide from Kilombero traders and police. One Kenyan trader interviewed, who deals directly with the Tanzanian farmers, has not been to Arusha since 2004. Another dealing through Kilombero states that he is afraid of bypassing Kilombero.

5. Traders from Nairobi acting in Tanzania

Cooperation between Kenyan and Kilombero traders in Arusha is very good, except for the enforcement of the above mentioned monopoly. That means that in the high season the Kenyan traders do not even need to come to Tanzania for every transaction to get the best quality. They merely inform their partners about the amount and grade of the onions they want to buy. All traders interviewed stated that they have a profound trust in their brokers and rely on them to contact the farmers. Even though they personally come to Arusha to check the quality and negotiate the prices on their own during the low season.

Corruption in Northern Tanzania

The traders who bypass the Kilombero wholesale market feel harassed by the police in Northern Tanzania and Arusha. The police regularly check all their permits and passports. The traders cooperating with Kilombero do not feel harassed, even if one stated: "the police harass us only at night". However, transporters have to bribe the police. Each trip from Mang'ola to Arusha costs them approximately 15 USD in bribes which the truck owners pay.

7 Namanga border point

Onions from Northern Tanzania going to Wakulima or other markets in or close to Nairobi are cleared in Namanga, a small border town, with 6000 habitants on the Kenyan and 4000 on the Tanzanian side. Farmers and traders involved in CBT do not know much about the fees and levies which the Tanzanian and Kenyan border authorities collect at the Namanga border. They leave the official documents and contacts in the hand of a small number of clearing agents.

7 A Clearing Agents

There are exactly six registered clearing agents on the Tanzania side and five on the Kenyan side of the Namanga border point. There are more people active in clearing at the border, but these use the names/license of the officially registered clearing agents. The service providers clear all kind of goods which cross the border at Namanga going both ways.

Concerning CBT in onions a quasi fixed rate is charged for every clearing. It is 40, to 42,000 TSH (30 – 31 USD) in Tanzania and 12, to 13,000 KSH (176 – 191 USD) in Kenya. So, whatever the rates at the border are on a certain day, the traders mostly have the same costs, except for fines for overloading. Furthermore, the clearing agents mostly have the same revenues independent of their costs. They manage everything with the border officials as soon as a trader calls them, so that clearing at the border takes only from 45 minutes to two hours. The Kenyan clearing agents need to have partners in Nairobi to pay the levy to the Kenyan Revenue Authority (KRA). All traders and farmers involved in CBT have a profound trust in their clearing agents, who take care of all border regulations.

7 B Border Authorities in Namanga

Namanga seems to be a town built up around some houses accommodating a numer of authorities. From immigration through Ministry of Agriculture to Revenue Authorities, and the Kenyan Public Health office, plenty of actors are involved in enforcing the regulations concerning CBT. The Kenyan and Tanzanian border officials are mainly concerned about the smuggling of other goods, and are not interested in CBT in onions. Immigration officials play only a role if a driver or trader has no passport.

Tanzania

Here two government institutions are involved in CBT in onions at the Namanga border. The Tanzanian MoA investigates the quality of the goods exported, while the Tanzanian Revenue Authority (TRA) checks whether the traders are registered.

Tanzanian Ministry of Agriculture

As the first step of CBT, even before the TRA gets involved in CBT, the MoA has to approve the quality of the goods and check to see whether all documents required are available. The Tanzanian MoA representatives at the border inspect the goods, charge an inspection fee, and issue a phytosanitary certificate per export. Traders who fulfil the documentation requirements of the TRA and the quality control of the MoA can export their goods to Kenya. The quality control does not cause any inconvenience, because the commodities the traders buy at the farm gate are already graded. Naturally, the traders monitor the quality of the goods beforehand, to make a profit when they sell in Kenya. Therefore, the Tanzanian MoA allows nearly every trader to export the onions he brings to Namanga. MoA and TRA are more concerned that traders might use the trucks to smuggle other goods. The inspection fee which has to be paid for a 10 tons truck is approximately 3-4 USD. The fee for the phyto-sanitary certificate is the equivalent of 15 USD in TSH.

Tanzania Revenue Authority (TRA)

To export onions from Mang'ola the **Tanzania Tax Revenue Authority (TRA)** has to be informed. TRA officials estimate that about 100 tons (10 trucks of 10 tons) of onions are traded through Namanga in the high season. The role of the TRA in CBT is to ensure that the exporting traders are registered entrepreneurs. The TRA officials only interact with clearing agents and not with traders or transporters, like their Kenyan colleagues.

Box 9: Official Documents for Cross-border Trade[26]

Traders officially using the Namanga border for export need to have the following documents:

- Tax ID No (TIN) for income tax of traders;
- Exporting horticulture business licence from Ministry of Trade (MoT);
- Radioactivity Certificate from Tropical Pesticides Research Institute (TPRI);
- Invoice document;
- Single bill of entry.

[26] TPRI: In order to receive the radioactivity certificate the trader has to submit a sample of his goods for one analysis on radioactivity and diseases.

The invoice document is needed to tax the exported goods. The value of the commodities is measured according to the invoice.

The single bill of entry is designed for different purposes and commodities (import, export etc.). The code CPC E100 stands for "Export of non processed horticultural goods". The Commodity Code is an international standard for trade items of the WTO. The code 0712.20.00 stands for onions.

The number of documents and their complexity make them difficult to understand. Completing them without any prior experience and special knowledge is quite difficult. This is the reason why the clearing agents and not the traders do it.

Moving to Kenya:

Many other border authorities are involved in the CBT in onions. They are more or less involved in monitoring, smoothing or hindering CBT. KEPHIS and the Kenya Revenue Authority (KRA) play a major role, while the Kenyan Public Health Office charges a high levy, but seems not to play a major role here. The Kenya Bureau of Standards is equally low key, and does not monitor the commodities, while the police are a factor which should neither be underestimated nor overestimated: The traders in CBT state that corruption is not too endemic.

Kenya Plant Health Inspectorate Service (KEPHIS)

KEPHIS inspects the quality of the imported commodities. It is only involved in the import of agricultural products. KEPHIS requires the certificate of origin from the Chamber of Commerce in Tanzania in order to prove that the products originate from Tanzania.

The KEPHIS border officials charge 500 KSH per clearing. The quantity of onions crossing the border does not matter. One or five trucks would cost the same amount of 500 KSH. The border representative of KEPHIS seemed to be the one most involved in CBT from the official side. KEPHIS opens the trucks, estimates the number of bags together with the driver and also checks if there are only onions on the truck. It is rare for a truck of onions not to be accepted for import by KEPHIS, they issue the phyto-sanitary certificate to nearly every trader.

Kenya Revenue Authority (KRA)

The KRA collects a levy of 1 KSH per kg of horticultural products that crosses the border. It is not a customs duty, just a levy, which is still allowed inside the East African Community (EAC). Every bag is counted as containing 100 kg, even if they normally hold more (on average 125-145 kg).

Kenya Public Health Office

According to the Kenyan Clearing Agent the Kenya Public Health Offices charges 1.000 KSH. These officials also do not check the trucks personally. They cooperate with KEPHIS. If KEPHIS is satisfied with the quality of the onions the Kenyan Public Health Office issues a certificate as well.

Kenyan Police

Basically the Kenyan Police monitors the safety of the trucks before they are allowed to travel to Kenya. However, this is always a decision of a single policeman and leaves room for arbitrariness. But according to clearing agents and traders the situation has greatly improved over the past few years and policemen seldom ask for bribes. Furthermore, the police collect a road toll equivalent to 16 USD in KSH.

Kenya Bureau of Standards (KBS)

KEBS is involved, issuing certificates to traders. KBS does not check the trucks or consult the traders or clearing agents. Nor do they charge a fee for the certificates they prepare, basically only KEPHIS informs KBS about the commodities traded.

7 C Profit of the clearing agents

As mentioned earlier intermediaries involved in CBT face high clearing costs for crossing the border. They are 31 USD (40, - 42,000 TSH) in Tanzania and 176 – 191 USD (12, - 13,000 KSH) in Kenya. The profit of the clearing agents is difficult to calculate for the Kenyan side, because the KRA estimate and does not weigh the amount of onions transported on the trucks.

Table 31: Estimated profit of the Clearing Agent

Tanzanian Clearing Agent	USD	Kenyan Clearing Agent	USD
Revenue per clearing 40. – 42.000 TSH	31 – 32	Revenue per clearing 12. – 13.000 KSH	176 – 191
Charges to pay to		**Charges to pay to**	
Tanzania Revenue Authority	0	Kenya Revenue Authority (1 KSH per kg, Estimations form 8 to 10 tons)	118 – 147
Tanzanian MoA	19	Kenyan MoA	0
		KEPHIS (500 KSH, per clearing)	7
		Police, road fee (equivalent in KSH, per truck)	16
		Kenya Public Health Office (1000 KSH, per clearing)	15
Profit per clearing in USD	12 – 13	Profit per clearing in USD	6 – 20

(Source: own computation)

The Tanzanian clearing agent makes 12 – 13 USD and the Kenyan 6 – 20 USD profit per clearing. They clear three to seven trucks per day. The profit of the Kenyan clearing agent fluctuates markedly according to the estimations of the KRA. The KRA charges 1 KSH per kg of onions. But as mentioned earlier they estimate the weight of the transported onions and think that only 5 - 8 tons trucks cross the border, instead of 10 tons trucks. This is in so far problematic that the clearing agents mostly charge the same rate to the traders, independent of the levy, which is charged by the KRA. Therefore traders have absolutely no knowledge of the costs of the clearing agents, and do not know if the profit of the clearing agent is extremely high or quite low.[27]

8. Brokers in Nairobi

In their activities brokers at the Wakulima wholesale market in Nairobi follow the a specific logic: "*The trader has the commodities, I have the customers*". Therefore CBT plays a significant role in the broker's income. In times of low supply from Tanzania their position is very weak, because intermediaries bring a smaller amount of onions from Tanzania. At those times intermediaries are directly contacted by wholesalers immediately upon arriving at the market. The situation of the brokers is good only in times of high supply, then the intermediaries need them to find customers and they sell ten to twenty tons per week.

9. Wholesalers and porters at the Wakulima Market in Nairobi

Only the Wakulima market is relevant for onion wholesale. There are around 40 onion wholesalers at Wakulima. Even if they are less poor than farmers and retailers they face economic problems and cash constraints. In addition to the problematic infrastructure of the Wakulima market they suffer especially in times of high supply from Tanzania. From July to September the volume of traded onions is so high that prices are under pressure.

5.3 Constraints and Opportunities in Cross-border Trade

The analysis clearly shows the bottlenecks that the actors involved in CBT are confronted with. Keeping in mind that the Kenyan farmers, who are not actors in CBT, are the losers of CBT it has to be queried whether CBT should be supported.

The Kenyan MoA has to decide whether they want to support Kenyan farmers to be competitive with the Tanzanian farmers, who produce a much better quality for lower prices. On the one hand it would be a good idea to support the Kenyan onion

[27] If for example the KRA only estimate that 5 tons cross the border, a Kenyan clearing agent could make a profit of 64 – 79 USD for one clearing. The KRA officials stated that sometimes 5 tons trucks cross the border, while the traders denied this. Therefore, it is not possible to determine the clearing agents profit based on KRA estimates.

producers in improving their performance. On the other hand, subsidies for an uncompetitive sector make little sense if a common market is to be established by 2012. But Kenyan farmers could be supported in investing in crops other than onions.

Nevertheless, the majority of actors involved in CBT benefit from CBT. The increasing volume of onions produced in Tanzania but consumed in Kenya leads to decreased prices, which is beneficial for the Kenyan consumers who are able to consume more onions. Consumers in East Africa are not the only beneficiaries of CBT.

Farmers, intermediaries and clearing agents involved in CBT are able to boost their income through this new opportunity. Only the strength of the Kilombero traders association presents a tough bottleneck for the farmers in Karatu and the traders from Wakulima market. The increased production leads to more work for field workers, porters and other participants in the horticultural sector.

The analysis reveals that everything possible has to be done to smooth CBT, even if the macro-economic dimension of onion CBT is not that important. The obstructive institutions in particular could be further analysed and consulted, to make CBT easier for the private actors involved.

- The political constraints and hostilities in Tanzania could be reduced if local politicians realized that Kenyan intermediaries are not exploiting but transacting business with Tanzanian farmers.
- The Kilombero wholesale market traders association should stop hindering CBT with illegal measurements.
- The KRA has to reconsider its policy of estimating the weight of trucks as it is not transparent. Cooperation between the Tanzanian border authorities and the Kenyan authorities would permit the KRA to use the weight measured by the Tanzanian officials. Even if the KRA estimation increases the levy which the traders have to pay it is not clear how the levy is collected.
- Another aspect is that too many institutions are involved on the Kenyan side of the border. The research did not reveal any need for the involvement of KBS and the Kenya Public Health Office in onion CBT.

With regard to transportation costs cross-border traders are confronted with three key problems.

- Fuel prices are constantly increasing and represent the highest share of their costs.
- Access to transport is not always guaranteed. For example, during high supply traders sometimes are not able to transport their onions from Tanzania to Kenya because they do not have transport at their disposal.
- Transport prices fluctuate. In line with market forces the cost of renting a truck rise if the prices for onions fall. According to the traders involved the cost of renting a truck is 50-60 % higher in high supply season than in low supply season.

With regard as to whether the situation of the poorest actors could be improved by intervention or research in CBT only two possibilities could be found.

- Exclusion of the traders of the Kilombero market would increase the profit of the Tanzanian farmers, who are poorer than their trade partners.
- Organising farmers to help them negotiate with intermediaries from Kenya and Tanzania might further increase their power and profit share. (not only CBT).
- Both governments have to harmonize their measurement standards in cooperation with the value chain actors. Equal bag sizes would improve the negotiating power especially of smaller actors. Equal and reliable bag sizes would increase transparency in CBT. And furthermore they would improve the working conditions of porters if they were not too large. With regard to the role of the EAC in CBT in onions the application of the above mentioned article 4 §2-b of the Protocol on the Establishment of the EAC CU that states that adopting a common standard system for the valuation of goods is planned, could have a substantial impact on producers and traders because of its influence on the extended onion sacks from Mang'ola.

Last but not least: Upgrading could mainly improve the situation of the Tanzanian farmers. If they take over the transportation (renting trucks in TZ) and trading function in Kenya they will increase their profit. But they need to be enabled to do so through business and organisational training.

Weighing station at the border in Namanga
(Source:SLE-Team)

6 Conclusions

6.1 How market driven are the chains and what blocks them eventually

Our initial assumption was that value chains are driven by market forces due to the absence of state intervention in the economy of these particular agricultural commodity markets. However, as markets are only perfect in theory (Cp. Kimenyi 2002: 8) we see value chains grappling with powers that divert the forces of the market economy to other ends. Supply, demand and legal regulations are reviewed in this regard.

6.1.1 Supply

Supply in all value chains is characterised by high fluctuation of volumes and prices. Consequently, different actors suffer partly from very low profit margins while at the same time other actors gain a lot from the shortage or surplus of a certain commodity. Due to the fact that most actors operate within spot market relationships, and because actors following the farm gate are narrowed down to a limited number, these fluctuations lead to very good seasonal profits at trade level. In times of high supply, traders benefit more, in times of low supply farmers can sell everything they harvest for good prices. The level of adaptation of single actors to this seasonality is often low, with the exception of the Kenyan onion sector, which reacts to the supply from Tanzania. The reason for this is the expectation of high profits in the low supply season and not so much the degree of dependence on that particular business. Each actor has the choice to pursue one particular business or to operate another business, even the poorest ones. Hawkers for instance, sell a very small amount of tomatoes or onions, do not invest a lot and are flexible enough to switch to other commodities if required. However, those actors who have to invest some money (farmers, traders to buy bigger amount of commodities) experience the lack of access to capital as a major constraint for the improvement of their situation.

Additionally, it has to be concluded that most of the business relations are based on very individual concepts, either due to mistrust or due to bad cooperation experiences in the past. Surmounting mistrust is one of the major challenges in actors' relationships. However, several key resource persons have identified empowerment of single actor groups as the major means to improving the groups' position in the chain in order to increase their benefit share. Working in groups could strengthen the bargaining power and open up access to credits. While group

production is often shunned by the farmers, trading together is a more viable option. Micro-credits for groups are very popular in both countries.

Most of the farmers produce onion and tomatoes because it is – despite all the hardships – still lucrative for them. However, access to the markets is very restrictive, sometimes with more or less legal instruments used as in the Kilombero wholesale market to keep out unwanted contestants. As the state is either unwilling or not able to fulfil its control function over the markets the economic competition is limited.

6.1.2 Demand

The chains are not demand driven to the extent that consumers' preferences are transmitted directly to the production level. At the same time, consumers seem to have very few requirements regarding the products to be purchased i.e. they simply buy what is available. An exception is the dominant demand for Tanzanian onions in Kenya which has a clear impact on the onion value chain in both countries. This is also the case, as the majority of consumers lack the income to engage in market competitive products which would vary in the quality they offer. The increased demand for horticultural products is reflected mainly in terms of requested volume, and not in a demand for higher quality driven by health issues for instance. Supermarkets play a minor role in driving quality according to the study's results. First, the volume traded by supermarkets is still very low compared to the local markets; second, the supermarkets often buy vegetables according to the same criteria as their colleagues at local retail markets: by visual judgement only.

However, the chains are driven by the market to that extent that the prices vary depending on the supply. There are no artificial shortages created and the prices mirror the relation between supply and demand.

6.1.3 Legal regulations

Legal regulations still play a role within the liberalised market. The question is what impact do regulations have, are the actors aware of their existence and how are these rules enforced? Bearing in mind that the respective value chains are dominated by the informal sector, power among authorities and actors is distributed unequally here. While the authorities gain a relevant amount of revenues for their budget from the market activities, the services provided in terms of monitoring or regulation over the market are scarce.

None of the authorities the study team visited records statistical data about volumes or values traded on local markets. Any public (and sometimes partly privatized, as in Arusha) organised market provides infrastructure at the location and sometimes related services such as garbage collection. At the same time, the market space

seems often to be too limited (esp. in Nairobi) compared to the number of possible actors; in other words the location is a bottleneck and market access is restricted. This situation causes an unbalanced distribution of market related power. Service delivery is often flawed by several aspects. Markets like Gikomba often lack a unified authority at all as several officials interfere, making it hard to oversee things such as regular garbage collection. This fact taken together with the deficient infrastructure (both on the market places and the transportation routes) leads to disadvantages for the commodities (such as spoilage due to weather conditions) as well as for the actors.

6.1.4 Legal uncertainty

Uncertainty of the law is an issue that can be assumed to influence negatively the relations among the actors. As most of these relations are of a spot-market nature, almost no contracts or other agreements with a binding character exist other than a gentleman's agreement. While it allows the actors a certain flexibility– one which a lot of the farmers were equally not willing to trade against the long term security of contract farming – it does not help to build up trust among the chain actors. As the major Tanzanian tomato processing company Red Gold reported, past experiences with tomato suppliers (i.e. farmers) have been so unstable - i.e. breaches of unwritten contracts - that the company no longer enters into such contractual relationships. They now receive their supplies from large scale farmers or spot market sales despite the fact that their high demands for raw products are not being completely satisfied.

The same is true for relations that a lot of farmers have with their brokers at the markets who promise them certain prices but then fail to deliver, often for their personal benefit. It can be assumed that a more stable law of contract, timely and cost-effective enforcement mechanisms and also a higher public trust in these mechanisms would help to stabilize such (quasi)-contractual relations.

The limit here is however the economic situation of a lot of farmers who are so poor that an enforcement of compensation payments is only partly realistic. Another negative factor is that when taking into account that the authorities concerned often act in favour of the actors who have some economic and/or political means, even upgrading the legal situation might not help but worsen the situation for weaker actors in the chains.

6.1.5 Measuring standards

Actors in Kenya have the advantage that they use weighing scales when trading their products while this is seldom the case in Tanzania. It can be assumed that this gives the Kenyan sellers greater bargaining power.

While measuring and packaging standards are widely unregulated it seems that the market has established its own unwritten rules. For tomatoes this seems to work better than for onions. Especially in Tanzania, the use of oversized onion bags is so widely accepted that farmers face income disadvantages when trading their produce, but have no other chance than to bow to the demand of the traders.

6.1.6 Food quality standards

It can be concluded that while certain legal regulations do exist for both commodities in both countries the dissemination policies of the authorities concerned is not auspicious. In this way the regulations are neither known nor applied by any of the actors or direct chain supporters such as the extension services. As described above consumer demand to enforce such regulations is non-existent. The assumption often found in relevant literature, that export standards would trickle down into the domestic markets could not be proven. As the commodities researched are mainly not exported farmers often lack the necessary extra facilities and training for applying such standards as GlobalGAP (formally known as EurepGap) or KenGap. It seems that there is no incentive for any of the actors to apply such standards as they would incur greater costs with no real gain as there is no premium for such standards on the domestic market

6.2 Comparing the Value Chains

It is worthwhile to comparing the two value chains in the two respective countries to discover any potential for the other chains.

In general the research team found that a number of similarities exist in both countries especially in the fact that the level of legal regulations applied is quite low and that almost all transactions are of a spot market nature.

However the markets in Kenya – even though access to them is limited - seem to be much more complex often including many more actors than in Tanzania, where some of the markets are strictly controlled by cartels (see Chapter 5.2). It can be stated that this applies even more to the onion chains in both countries, where more brokers and intermediaries are involved.

A very special aspect of the chain is to be found at the input level, as the breeding and reproduction of seed material is much more liberalized in Tanzania than in Kenya, with the result that such inputs are quite cheaper on average in Tanzania.

6.2.1 Comparing the Value Chains of Tomatoes

The similarities found in the chains of Tanzania and Kenya are that farmers prefer to plant Col J and Onyx to other varieties. There seems to be a high use of chemicals on farms in both countries with few producers implementing ecological/organic production methods. In both countries the majority of tomato farmers do not store their produce, chiefly because facilities are not available. The level of cooperation among the actors is low, as they do not consider it necessary to build up long tern relationships. The packaging used for tomatoes is not standardized by law but has established itself in the market in both countries with a more or less standard weight even though the produce is not generally weighed. In both countries brokers do not play such a dominant role. The only exceptions to this can be found in times of low supply for the retailers esp. the big supermarket chains and in times of high supply for the more remote farmers, who have to find buyers for their produce in a short space of time. In both countries the better graded tomatoes are sold to the important wholesale markets (Arusha, Nairobi), while the poorer grades are sold in the local markets in the region. However, farmers in Tanzania seem to be more involved in trade and transport than their respective colleagues in Kenya. Therefore they have better and more frequent relationships to their customers and possess a better overview of prices and the market situation. While brokers and other actors elongate the chain in Kenya, tomato farmers in Tanzania are less dependent on them.

The differences in the chains were various. While the Mwea production region mostly employs rain fed irrigation the Tanzanian farmers had access to furrow irrigation systems. Record keeping was weak with farmers in both countries but skill seemed to be wider spread in Kenya. At trade level the team found that tomatoes were graded into six grades in Kenya, while only 2-3 grades were used in Tanzania. The packaging uses different crates in both countries (TZ: 30-40 kg; KE: 32 kg and 64 kg). The Kenyan farmers prefer to sell most of their commodities directly at farm gate, while Tanzanian producers sell the majority of the goods at the markets. When brokers buy directly at the farm gate they normally also act as wholesalers on the markets in Tanzania, while in Kenya this is often performed by a different person. While Tanzanian brokers also offer inputs, credits and similar to producers, brokers in Kenya also act as information agents, providing news about market demand, diseases etc.. The competition among brokers seems to be higher in Kenya esp. at the farm gate. Farmers in Kenya depend more on them in terms of market access

and information. In Tanzania they depend more on brokers and intermediaries in terms of input supply.

Table 32: Comparison of costs in tomato production

Costs in US$/kg	Kenya 1. season	Kenya, 2. season	Tanzania, 1. season	Tanzania, 2. season
Seeds	0.001	0.001	0.001	0.002
Fertiliser/Pesticides	0.019	0.019	0.010	0.019
Labour	0.026	0.026	0.011	0.014

(Source: own computation)

6.2.2 Comparing the Value Chains of Onions

The differences in the chains could be found first and foremost at the input level, as the seed quality in Tanzania is better and more adapted to the climate and soil than seeds in Kenya are. Farmers' costs for pesticides in total are lower in Tanzania than in Kenya as farmers require less due to the good seed material. However, Tanzanian farmers tend to use more fertiliser even while costs are higher in Tanzania. As Kenyan onion farmers in Kieni West do not have access to irrigation their situation is worse. They also reported higher post harvest losses in the 1st season (high supply in Tanzania) due to finding no buyers for the products as Tanzanian onions flood Kenyan markets. Packaging in Kenya is standardized in 14 kg bags. However, their content generally tends to be more than 14 kg. This is an advantage to the farmers compared to Tanzania where farmers are forced to use the enlarged 120 kg bags.

The biggest difference however is in the overall quality of onions which is much higher in Tanzania than in Kenya. Tanzanian farmers have specialized in regional trade and produce directly for it. As a consequence, the seasons for the farmers are reversed. High season in Kenya is when the supply from Tanzania is low. In the low season in Kenya the farmers could grow more onions but there is no market because of competition from Tanzanian onions. In this season most farmers only cultivate onions "to keep the ball rolling", i.e. to maintain their links to the market. But they plant fewer acres and not all farmers do so. Tanzanian farmers profit from a slew of advantages, some of which have been stated above. Others are: dryer climate, which helps to dry onions on the field, better soil, lower labour costs, lower costs for land and better exchange rates. We assumed that the Kenyan farmers cut the onions earlier than in Tanzania because of the weather (see chapter 4.5.). In Tanzania the dry season is longer and in Kenya the risk of rain during harvest is much higher.

6.3 Potential for Poverty Reduction

From the facts presented above it is logical to conclude that potentials for poverty reduction in the tomato and onion sector in Tanzania and Kenya exist, but that attention needs to be given to the underlying details. Vegetable producers in the respective chains are normally not among the poorest, as demonstrated above. However other actors of the chains, who provide valuable services, are among those groups, namely groups of farm workers, hawkers and especially porters. As discussed above even while less poor actors (when compared with the countries average) were the main focus, this does not mean that poverty is not widespread among the chain actors. We saw that even actors such as wholesalers and brokers who profit relatively well are faced with low incomes and other forms of vulnerability.

We assume that national economic growth can contribute to poverty reduction if practicable distribution mechanisms are in place. Discussing the impact of direct poverty reduction reveals that the value chains can contribute in two specific ways: 1) providing employment opportunities, even for less skilled people to work on and off farms in rural and urban areas, 2) by becoming sectors which are accessible to newcomers, except farmers. New actors can enter the chain, because few regulations are enforced in this dominantly informal sector and therefore little input capital is required. In this regard, only the existing cartels present a bottleneck (esp. in the Tanzanian onion sector) that blocks entry into the business for newcomers. Due to heavy dependence on middlemen, these often take advantage of their position and take a large share of the profit. As their risk is lower than that of producers it could be argued that it would be fair to install mechanisms which channel more of the profit to farmers than to the middlemen (see box 6: Technoserve Hub).

This study did not investigate other obstacles confronting those who would like to enter the chains, but these would merit further investigation.

Onions and especially tomatoes with their specific income elasticity aspects present sectors that could grow in the next few years. However, these effects attributed to the growing middle-classes in East Africa also mean that the potential is in danger of remaining low: an expanding middle class population may increase its consumption of these vegetables but still the majority of the population in these countries will presumably not be part of this growth and therefore has no growth potential as consumers.

7 Recommendations

Dealing with the bottlenecks and opportunities in the chains described above is vital for improving their poverty reduction impact. Despite the detailed insight into the four different value chains provided by the material compiled, the research raised some new issues that should be tackled further.

Implementing actions to overcome the problems and utilizing the opportunities for the poor will be the task of the partner institutes and organizations of this study. As some of the partners intervene directly to combat poverty and others contribute to this goal through research activities, the recommendations presented below are divided into two sections.

Section one (Table 7.1.) shows recommendations to the AVRDC and the icipe for further research. Section two (Table 7.2.) shows proposals for practical intervention by GTZ, MoA and other. Each table takes a bottleneck or opportunity described above as its starting point and describes the actors concerned (or respectively a possible entry point, if infrastructure is concerned). From the interventions proposed expected outcomes are derived that contribute to poverty reduction.

7.1 Recommendation for further research

Table 33: Recommendations to International Research Centers

Bottleneck / opportunity	Entry point / actors concerned	Further research Suggested	Expected outcome
Job creation exists on and off farms	All levels	Quantify the employment creation potential in the sector. Investigate what possibly leads poorer actors to engage in the sector.	DC organisations are aware of sector potential in numbers. DC organisations are aware which hindrances for the poor have to be removed.
Low adherence to (quasi-) contractual relationships	All levels, esp. farmers to large suppliers (supermarkets or processors) and porters to retailers.	Research into the economic and legal implications of a higher level of formalisation of business relations in an informal sector.	DC organisations and ministry would be aware, if introducing a higher level of formalisation of business operations were to have a positive impact on poverty reduction.
The market for organic products is growing	All actors	Research if the market for organic products holds economic potential for smallholders	DC organisations are aware if and how the organic market could be used for poverty reduction
Farmers refrain from taking part in group and contract farming because they fear to lose their high profits during low supply	Farmers and contractors (supermarkets, wholesale companies, processors, bulk buyers)	Research if contract and/or group farming pays off for farmers in total over a year	DC organisations posses information of use to lobby producers into contract and/or group farming or if it is not worth wile.

7.2 Recommendations for interventions

Table 34: Recommendations for interventions

Bottleneck / opportunity	entry Point / actors concerned	intervention suggested	expected outcome
Missing market infrastructure leads to spoiling of products, exclusion and limiting of actors and unsanitary conditions.	Gikomba and Wakulima market in Nairobi, as also local market places in division Mwea and Thika.	Investing in infrastructure i.e. building paved market places, parking/unloading spaces, roofs or roofed stalls, enlarging the market space, electrifying the markets.	Less produce will be spoiled by weather conditions. Health conditions are improved. More actors can enter the market and work more freely. Parking spaces allow legal unloading of goods.
Bad or missing roads lead to spoiling of products during transport and make transport expensive.	Road from Karatu to Mang'ola (TZ). General road conditions in Kenya and Tanzania.	Pave roads.	Farmers gain greater independency from transporters as they can use non 4WD vehicles or local means of transport. Fewer products are spoiled on the road as fewer trucks get stuck.
Dependency of small scale farmers on external transport to collect the produce from several wide spread farms.	Onion and tomato farmers in Kenya	Organising trade hubs owned by farmers groups with group vehicles that collect the commodities for bulking	Farmers have a lower dependency on transporters and brokers
Low bargaining power for small-scale farmers: Most onion small-scale farmers depend on brokers, who come to the farm gate and either connect them with traders or organize transport and sell products at the urban markets on commission.	Onion farmers in Tanzania and Kenya	Farmers should organize themselves into trading groups and bulk their commodities.	Bulking of commodities increases farmers' bargaining power at the market. This leads to better prices. With group capital a lorry could be bought that would provide transport to the bulking place.

Porters lack formal recognition as market actors and therefore face exploitation and harassment.	Porters at all markets.	Organizing porters in groups. Providing porters with uniform clothing and ID cards.	Porters face less harassment from authorities. Grouping leads to increased bargaining power to enforce quasi-contractual relations.
Market transparency is low.	Wholesalers, brokers, retailers at all markets.	Establish market price information boards. PPP with KACE (Kenya) could provide daily prices from the production regions (but not from the market in question itself).	Bargaining power of weaker actors is raised.
Health risks through unprotected application of fertiliser & pesticides	All actors who are in contact with chemicals, esp. farm workers and farmers.	Establish PPP for the development of lighter protective suits which can be worn also in hot weather. Establish awareness raising programs for farm workers and farmers. Improve advertising and information from extension service and input suppliers for farmers.	Health situation of sprayers is enhanced.
Low adaption to oversupplies.	Tomato farmers (and respectively all other actors)	Utilization of existing storage facilities (like Mwea) and outreach programmes to the farmers. Capacity building for farmers (possibly in connection with brokers or intermediaries) on how to construct simple and cheap, non-electrified storage facilities.	High supply times are counterbalanced by storing products. A higher profit is realised for farmers and possibly also for intermediaries.

Limited dissemination of standards.	All actors, esp. farmers, farm workers, extension services and consumers.	Establish a free mobile phone information service by MoA for extensionists and subscribers to disseminate different information, i.e. standards. PPP with KACE possible in Kenya.	Farmers are more aware of residue levels and what standards are in effect.
Low adoption of standards.	Consumers	Invest in awareness raising campaigns (like the Kenyan HDC truck) to heighten the consumers' demand for residue free products.	Demand for residue-low vegetables has risen.
No access to credits on the market for wholesalers.	Wholesalers at Wakulima	Establish a desk of a microcredit institution on the market that lends to the wholesalers on a daily basis with low interest rates. Alternatively regulate the maximum interest rate for the private credit lenders who operate on the market.	Wholesalers have a higher profit.
Cess is collected at several points, varying also in amounts from district to district	Transporters, intermediaries, wholesalers, city councils and Central Revenue Authority	Unify Cess collection system. Regulate that Cess is only collected once for each commodity Distribute a percentage of Cess to the local markets for investment	Market places are improved Trade is smoothed Corruption is reduced
Gikomba market in Nairobi is not officially recognized. Market authority is split among different city council departments.	Nairobi City Council, wholesalers, retailers (Gikomba)	Nairobi City Council should recognize Gikomba as an official market place and bundle the market administration into one authority.	Traders and their customers have more security for their business.

No garbage collection service at Gikomba	City council (market authority) Nairobi	Market fees should be used to guarantee a regular garbage collection service	Hygienic situation is improved
Lack of trust among the chain actors.	All chain actors	Vertical integration by linking of different actor groups in a meta group. Promoting contract or quasi-contract farming for small holders with market adopted prices.	Profit of all actors is enhanced. Trust of all actors in the market and in other actors is enhanced.
Actors (esp. farmers) refrain from participating in micro credit programmes.	All actors (esp. in Kenya), esp. farmers, Micro credit institutions	Linking micro credit institutions to potential credit holders through awareness raising programmes that explain the real credit conditions to them.	Smallholders engage more in upgrading their businesses and are able to reduce their short term cash constraints.

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Annex I: Overview on Transport Activities

Step in VC	Path	Main Actors transporting	Other Actors involved	Means of Transportation	Owner of the Product / Financier
Production	Farm to Wholesale Market	- Farmers - (Brokers) - Intermediaries - Lorry Drivers/Owners	- Carriers	- on Foot - Public Transport - hired/owned Vehicle (Car, Pick Up, Lorry)	- Farmer - Intermediary
	Farm to (local) Retail Market	- Farmers - Retailers - Lorry Drivers/Owners	- Carriers	- on Foot - by Donkey (Cart) - Public Transport - hired/owned Vehicle (Car, Pick Up, Lorry)	- Farmers - Retailers
	Farm to Consumer	- [28]Consumers (large&individual) - large Suppliers		- on Foot - by Donkey (Cart) - Public Transport - hired/owned Vehicle (Car, Pick Up, Lorry)	- Consumers - large Suppliers
Trade	Wholesale Market to Retail Market	- Retailers - Cart Drivers	- Carriers	- on Foot - Public Transport - Hand Cart	- Retailers
	Wholesale Market to Consumer	- Consumers (large)	- Carriers	- hired/owned Vehicle (Car, Pick Up, Lorry)	- Consumer
Marketing	Retail Market to Consumer	- Consumers (large&individual)	- Carriers	- on Foot - Public Transport - Hand Cart - hired/owned Vehicle (Car, Pick Up, Lorry)	- Consumer

[28] Large Consumer: e.g. hotels, restaurants, schools, hospitals

Annex II: List of Interviewees

Interviewed Organisations and Institutions in Kenya and Tanzania

(Expert Interviews and Focus Group Discussions)

Tanzania		Kenya	
Institution	**Function**	**Institution**	**Function**
AVRDC	International Research Institute	Ministry of Agriculture (MoA)	
Karatu District Council		Ministry of Public Health	
Arusha Regional Office		Kenya Revenue Authority	
Arumeru District Council		Kenyan Plant Health Inspectorate Services (KEPHIS)	MoA's authority
Arusha Municipality Council		Kenyan Horticultural Development Program (KHDP)	NGO
Gorofani Village Council		Public Policy Research and Analysis (KIPPRA)	
Mang'ola Ward Council		Kenya Agricultural Commodities Exchange (KACE), Ltd.	Service provider
Ministry of Agriculture (MoA)		Kenyan National Task Force for Horticulture (KNTFH)	NGO
Tanzanian Revenue Authority		Horticultural Crop Development Authority (HCDA)	MoA's authority
National Microfinance Bank		Kenyan Bureau of Statistics	
Tanzania Horticultural Association (TAHA)	Umbrella NGO	Kenyan Agricultural Research Institute (KARI)	
Horti Tengeru	Training centre	Wakulima Market Administration	
FAIDA MALI	NGO	Nairobi City Council	
SNV	NGO	Gikomba Market Administration	
GTZ at the East African Community (EAC)		Karatina Market Administration	
Hakikazi Catalyst	NGO	Agricultural Finance Cooperation (AFC)	MoA's authority

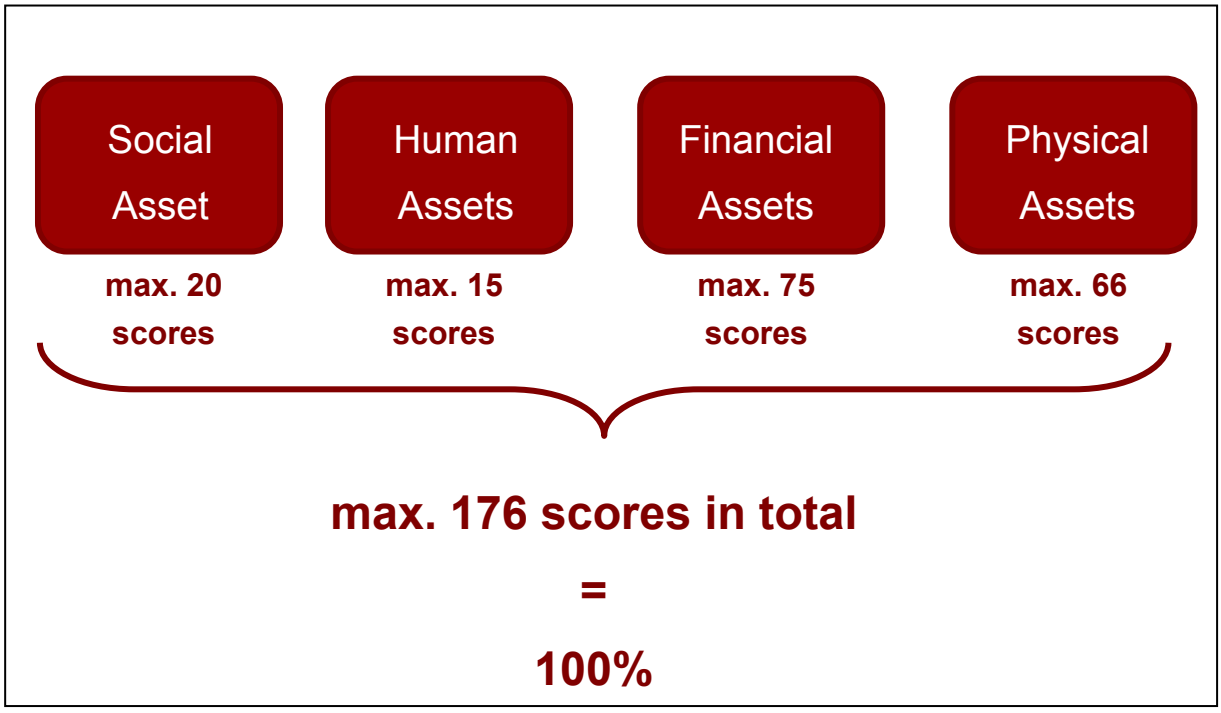
Red Gold	Tomato manufactory	Equity Bank	Microfinance Bank
Mukpar Ltd.	Input Supplier	K-REP Bank	Microfinance Bank
Trade Organisation, Kilombero Market	Management Wholesale Market	Farm Concern International	NGO
Akmeni	Farmer Group	Tegemeo Institute	Private Research Institute
		Technoserve	NGO
		Uchumi Ltd.	Supermarket
		Greengrocers Zucchini Ltd.	Large Supplier
		Gikomba Tomato Dealer Group	Trader Group
		Murera Group	Farmer Group
		Mwituria Mamunyi	Farmer Group
		Birisha Farmer Field School (BSSF)	Farmer Group
Total amount of qualitative Interviews		**Total amount of qualitative Interviews**	
31		39	
Total amount of Focus Group Discussions		**Total amount of Focus Group Discussions**	
3		7	

Annex III: Schedule of the Study Team

Date	Activity
23.07.07	Departure Frankfurt/M.
24.07.07	Arrival Nairobi
25. – 26.07.07	Stay in Nairobi, first contacts in Nairobi
26.07.07	Transfer Nairobi – Arusha, Tanzania
26. 07. – 05.09.07	**Stay in Tanzania**
27. – 31.07.07	Preperation initial meeting tanslators
01.08.07	Workshop at AVRDC, Arusha
02.08.07	Meeting with Kenyan Workshop participants
03. – 05.08.07	Preparation pretest, interviewing key resource persons
06. – 12.08.07	Data collection with pretest in Arusha
13. – 19.08.07	Data collection in Arusha, Arumeru distric, and Karatu district
20. – 26.08.07	Analysing data and final talk with AVRDC
26.08.07	Departure Arusha
26.08. – 31.08.07	Excursion week
01.09. – 04.09.07	Data analyses, preparation Kenya
05.09.07	Transfer Tansania – Kenia
05.09. – 27.10.07	**Stay in Kenia**
06. – 09.09.07	Preparation of data collection, meeting translators
10. – 15.09.07	Data collection in three sub-teams 1. Nairobi, 2. Mwea, 3. Kieni West
17. -21. 09.07	Data collection in three sub-teams in Nairobi (markets, institutions)
22.09. – 14.10.07	Analysing data and writing the report in Dinai, preparation of the final workshop Transfer to Nairobi
15. – 16.10.07	Final preparation oft he workshops
17.10.07	Final workshop in Nairobi
18. – 19.10.07	Analysing the workshop
27.10.07	Departure Nairobi

Annex IV: Calculation of the Livelihood Level

For the livelihood analysis all answer possibilities for the different questions in the livelihood questionnaire received scores regarding their influence on the livelihood assets. An assessment scale from 0 (= poor livelihood condition) to 5 (= strong livelihood condition) has been applied for every question. This results in a possible range of 12 to 176 scores that one respondent can achieve (the lowermost limit is unequal 0 because for some answers the lowest score to achieve was 1) (see figure below). This scale was verified by local experts from Tanzania and Kenya. To facilitate the comparison of the livelihood level of each actor group, the achieved score of each actor group in median was calculated in percentage (176 scores = 100%).



Calculation of the livelihood level of the VC actors
(Source: own outline)

Annex V: Questionnaires

PRODUCTION

Country: _____ Date: _____ Intw-No.: ____

Intw: _____ Transl.: _____

District: _____ Village/Town: _____ ☐ rural / ☐ urban

Product: ☐ tomatoes / ☐ onions /☐ both

Actors Name: _____ ☐ male / ☐ female Actors location: _____

Position in VC:

☐ production ☐ transport ☐ trade ☐ marketing ☐ consumer ☐ other (specify) _____

Cultivation

1 How much acres do you cultivate in total?
_____ acres in total

2 Do you consider yourself as a …. farmer? *(read out the answer possibilities)*
1. ☐ small scale 2. ☐ middle scale 3. ☐ large scale

3 On how much acres do you produce tomatoes/onions?
_____ acres for tomatoes/onion

4 Are tomatoes/onions the most important crops for you? *(read out answer possibilities)*
1. ☐ the most important crops 2. ☐ among the most important crops
3. ☐ no important crops

5 Which unit do you use to measure your products and what is the weight in kg of one unit?
1 _____ (crate/bucket/bag/other)= _____ kg

6 Which varieties do you cultivate?

Only for tomatoes/onions

	variety	Actual acres	Irrigat. plot? yes	Irrigat. plot? no	Reason for cultivation (code)	available seed quality (code)	number of seasons/ year (which months*)	yield per season _____ (unit)	% of yield selling to market	% of yield for own consump-tion	% of yield wasted
1.								1.			
								2.			
								3.			
2.								1.			
								2.			
								3.			
3.								1.			
								2.			
								3.			

Code for reason of cultivation:
1=high demand
2=cheap in production
3=low labour input required
4=easy to get seeds
5=high seed quality available
6=high yield
0=other (specify)

Code for seed quality available:
1=high seed quality
2=average seed quality
3=low seed quality

For analysing usage of yield:
< 40%
41% – 60%
61% – 80%
> 80%

_____

_____

7 If you need to, do you have access to an adequate place to store your products? *(read out the answer possibilities)*

1. ☐ yes, and it is enough
2. ☐ yes, but not enough
3. ☐ no, and I don't need
4. ☐ no, but I would need

7.a If no, but I would need to, what hinders you?:

1. ☐ too expensive
2. ☐ no possibility here
3. ☐ other (specify) _____

8 Do you grade or sort out your products? If yes, please explain how:

_____

_____

Costs

Input		**Costs in KES per season**		
		1. season	2. season	3. season
labour	paid workers (also casual ones)			
	unpaid workers			
seed				
Fertiliser *(if detailed answer necessary, write down on the back side of the page)*				
Pesticide *(if detailed answer necessary, write down on the back side of the page)*				
Technology				
other inputs _____				
Transport				
Storage				
fees/taxes				
other costs (specify) _____				

9 Could you give me an estimation of the total costs you have to produce tomatoes/onions?

1. season: from _____ to _____ (KES/season)

2. season: from _____ to _____ (KES/season)

3. season: from _____ to _____ (KES/season)

Selling

10 Where do you sell your commodities?

Where		**in which city or village/ district/ ward**	**what is the most important place** (value from 1-3)
farm gate			
collection place in the village			
local market (near farm)			
wholesale market (in City)			
retail market (in City)			
other (specify):			

11 To whom do you sell your products? *(more than one answer possible)*

To whom			**who is the most important supplier** (value from 1-3)
1	directly to consumer		
2	vender groups		
3	broker (wholesale; doesn't own products)		
4	Intermediary		
5	Retailer		
6	road side seller/hawker		
7	Kiosk		

8	small supermarket		
9	large supermarket		
10	large supplier		
11	hotels, hospitals, schools		
12	other (specify):		

12 Do you mainly sell to the same buyer(s)?

1. ☐ yes 2. ☐ no

a. ☐ because of family relations a. ☐ because I look for the best price

b. ☐ because we developed good business relations b. ☐ because I don't know anybody I trust

c. ☐ because of contractual relation c. ☐ other (specify) _____

d. ☐ other (specify) _____

13 How much do you get usually per unit?

a) high supply season: from _____ to _____ KES per _____(unit)

b) low supply season: from _____ to _____ KES per _____ (unit)

14 How much of the product do you sell per …

1. ☐ day 2. ☐ week 3. ☐ month 4. ☐ season

14.a high supply season: _____ of _____ (unit)

14.b low supply season : _____ of _____ (unit)

15 Who in your opinion sets the price? *(read out the answer possibilities)*

1. ☐ me 3. ☐ bargaining process → agreement between both partys

2. ☐ the other party 4. ☐ other (specify) _____

Communication/Cooerpation (inside actors group → producers)

16 Where do you catch up on relevant information for your business? (*more than one answer possible*)

Value Value

1. ☐ from family members	_____	9. ☐ from village head	_____
2. ☐ from neighbours	_____	10. ☐ from school	_____
3. ☐ from donor NGO	_____	11. ☐ from religious leader	_____
4. ☐ from public extension services	_____	12. ☐ own knowledge	_____
5. ☐ from private extension services	_____	13. ☐ at the market	_____
6. ☐ from mobile phone	_____	14. ☐ from broker	_____
7. ☐ from other media (prints, radio)	_____	15. ☐ from intermediary	_____
8. ☐ from farmer association	_____	16. ☐ other (specify) _____	

Among all the answers that you gave, which source of information has the biggest (1) / second biggest (2) / third biggest (3) importance for you?

17 Is there any group/cooperation/association for (tomatoe/onion)-farmer?

1. ☐ yes 2. ☐ no

17.a If yes, do you participate

1. ☐ yes 2. ☐ no

Constraints

18 Which circumstances do constrain your current cultivation of tomatoes/onion?

Value		Value	
1. ☐ access to land	_____	8. ☐ access to necessary technology	
2. ☐ access to irrigation	_____	9. ☐ diseases/pest	____
3. ☐ access to high qualitative seeds	_____	10. ☐ storages	____
4. ☐ access to credit	_____	11. ☐ access to means of transport	__
5. ☐ running costs (e.g. input)	_____	12. ☐ regulation	____
6. ☐ available labour	_____	13. ☐ authority (specify)	____
7. ☐ access to information	_____	14. ☐ other (specify) _____	
15. ☐ nothing		16. ☐ I don't know	

Among all the answers that you gave, which constrain has the biggest (1)/ second biggest (2) / third biggest (3) importance for you?

TRANSPORTATION

Country: _____ Date: _____ Intw-No.:_____

Intw: _____ Transl.: _____

District: _____ Village/Town: _____ ☐ rural / ☐ urban

Product: ☐ tomatoes / ☐ onions /☐ both

Actors Name: _____ ☐ male / ☐ femaleActors location: _____

Position in VC:

☐ production ☐ transport ☐ trade ☐ marketing ☐ consumer ☐ other (specify) _____

Transportation

1 Are you an entrepreneur, employee or a casual worker?

means of transportation	**Entrepreneur/ self-employed**	**employee**		**informal sector**
		Permanent	seasonal	daily worker
Lorry				
Car / daladala				
small cart pulled by person				
small cart pulled by animal				
Bicycle				

2 Do you own the transport vehicle you use?

1. ☐ yes 2. ☐ no

2.a If not, who owns the transport vehicle?

1. ☐ transport entrepreneur 4. ☐ retailer 7. ☐ large supplier
2. ☐ intermediary 5. ☐ wholesaler 8. ☐ other (specify) ___
3. ☐ broker 6. ☐ farmer

3 Where do you collect your commodities? *(more than one answer possible)*

where		**in which city or village/ district/ ward**	**what is the most important place** (value from 1-3)
At the farm gate			
collection place in the village			
At the local market (near farms)			
wholesale market			
retail market			
other (specify):			

4 From whom do you buy/collect your commodities? *(more than one answer possible)*

From whom			**who is the most important supplier** (value from 1-3)
1	Farmer		
2	farmer group (specify) _____		
3	Broker (doesn't own products)		
4	Intermediary		
5	Retailer		
6	road side seller/ hawker		
7	Kiosk		
8	small supermarket		
9	large supermarket		
10	large supplier		
11	other (specify) _____		

5 To which place (city / market) do you transport your products?

_____

_____

6 To whom do you transport your commodities *(more than one answer possible)*

To whom			**who is the most important supplier** (value from 1-3)
1	directly to consumer		
2	vender groups		
3	Broker (doesn't own products)		
4	Intermediary		
5	Retailer		
6	road side seller/ hawker		
7	Kiosk		
8	small supermarket		
9	large supermarket		
10	large supplier		
11	hotels, hospitals, schools		
12	other (specify):		

7 Do you always transport the products of the same person (supplier)?

1. ☐ yes 2. ☐ no

If yes, why:

a. ☐ because of family relations

b. ☐ because we have developed good business relations

c. ☐ because of contractual relation

d. ☐ other (specify) _____

If no, why?

a. ☐ because I look for the best price

b. ☐ because I don't know anybody I trust

c. ☐ transport as required

d. ☐ other (specify) _____

8 Do you always transport the products for the same trader (entrepreneur)?

1. ☐ yes 2. ☐ no

If yes, why: If no, why?

a. ☐ because of family relations a. ☐ because I look for the best price

b. ☐ because we have developed good business relations b. ☐ because I don't know anybody I trust

c. ☐ because of contractual relation c. ☐ transport as required

d. ☐ other (specify)_____ d. ☐ other (specify) _____

QUESTIONS ONLY for Lorry drivers and owners

a) How much time do you need to make one tour?

_____ hours

b) How often do you make this tour a month? times:

_____

9 How much do you get paid for your work?

Paid per unit of transported good _____**(unit)**	**How much do you transport per one tour?** _____ **(unit)**	**Daily rate (in KES)**		**Working days per month**	
		times of high supply	times of low supply	times of high supply	times of low supply

10 Is the price fixed or fluctuating?

1. ☐ fixed payment

2. ☐ The payment fluctuates according to …

a. ☐ employer/ contract partner

b. ☐ amount of carried/transported commodities

c. ☐ hours you need to transport the products

d. ☐ other (specify) _____

11 What costs do you have? (Please quantify) *(read out answer possibilities)*

Input		**Costs in KES per day/week/month**
Labour	paid workers (also casual ones)	
	unpaid workers	
rent of selling location		
Market entrances/fees		
Maintenances		
Taxes		
road fees		
Fuel		
other costs		

12 If you need to, do you have access to an adequate place to store your products? *(read out answer possibilities)*

1. ☐ yes, and it is enough
2. ☐ yes, but not enough
3. ☐ no, and I don't need
4. ☐ no, but I would need

12.a If no, but I would need, why not:

1. ☐ too expensive
2. ☐ no possibility here
3. ☐ other (specify) _____

Communication/ Cooperation (inside actor group → transporters)

13 Is there any group/cooperation for transporters?

1. ☐ yes
2. ☐ no

13.a If yes, do you participate?

1. ☐ yes
2. ☐ no

Constraints

14 Which circumstances constrain your current trading business of tomatoes/onion? *(more than one answer possible)*

	Value		Value
1. ☐ access to credit	_____	8. ☐ no labour available	_____
2. ☐ running costs	_____	9. ☐ authority (specify)	_____
3. ☐ lack of storage possibility	_____	10. ☐ failure of payment	_____
4. ☐ lack of space	_____	11. ☐ low income	_____
5. ☐ lack of information	_____	12. ☐ other (specify) _____	
6. ☐ access to means of transport	_____	13. ☐ nothing	
7. ☐ set standards	_____	14. ☐ I don't know	

Among all the answers that you gave, which constraint has the biggest (1)/ second biggest (2) / third biggest (3) importance for you?

15 What quantity of the products you transport spoil before you can deliver them (in %)? Why?

a) How much? _____ %

b) Why? _____

ONLY FOR CROSS-BORDER TRADE

1 Who is involved in cross-border trade? ***(read out answer possibilities)***

1. ☐ transport entrepreneur
2. ☐ intermediary
3. ☐ broker
4. ☐ retailer
5. ☐ wholesaler
6. ☐ farmer
7. ☐ large supplier
8. ☐ other (specify) _____

2 How much of the commodities do you transport from Tanzania to Kenya?

_____ of _____ (unit) per 1.☐day 2.☐ week 3.☐ month 4.☐ season

3 How much do you have to pay in fees per unit?

from _____ to _____ KES per _____ (unit)

4 Are there any circumstances that constrain the cross-border trade?

☐ yes ☐ no

4.a If yes, which ones? *(more than one answer possible)*

	Value
1. ☐ waiting time/procedure at the border	_____
2. ☐ cooperation with clearing agent	_____
3. ☐ price negociation with clearing agent	_____
4. ☐ fees	_____
5. ☐ authority (specify)	_____
6. ☐ other (specify)_____	

Among all the answers that you gave, which constraint has the biggest (1)/ second biggest (2) / third biggest (3) importance for you?

Trade

Country: _____ Date: _____ Intw-No.:_____

Intw: _____ Transl.: _____

District: _____ Village/Town: _____ ☐ rural / ☐ urban

Product: ☐ tomatoes / ☐ onions /☐ both

Actors Name: _____ ☐ male / ☐ femaleActors location: _____

Position in VC:

☐ production ☐ transport ☐ trade ☐ marketing ☐ consumer ☐ other (specify) _____

Tasks and Functions

1 Are you an entrepreneur, employee or a casual worker?

	Entrepreneur / self-employed			**Employee**		**Informal Sector**
	No. employ-ees	Owns commo-dities	Owns location of selling	Permanent	Seaso nal	Casual
Broker						
intermediary						

2 Are tomatoes/onions the most important crops for you? *(read out answer possibilities)*

1. ☐ the most important crops 2. ☐ among the most important crops 3. ☐ no important crops

3 Which unit do you use to measure your products and what is the weight in kg of one unit?

a. for buying 1 _____ (crate/bucket/bag/other) = _____ kg

b. for selling 1 _____ (crate/bucket/bag/other) = _____ kg

4 Where do you buy/collect your commodities? *(more than one answer possible)*

Where		**in which city or village/ district/ ward**	**what is the most important place** (value from 1-3)
At the farm gate			
collection place in the village			
At the local market (near farm)			
wholesale market (in city)			
retail market (in city)			
other (specify):			

5 From whom do you buy/collect your products? *(more than one answer possible)*

Where			**who is the most important supplier (value from 1-3)**
1	Farmer		
2	farmer group (specify) _____		
3	Broker (wholesale) (doesn't own products)		
4	Intermediary (wholesale)		
5	Retailer		
6	Road side seller/hawker		
7	Kiosk		
8	small supermarket		
9	large supermarket		
10	large supplier		
11	other (specify):		

6 Do you mainly buy from the same person(s)?

1. ☐ yes 2. ☐ no

If yes, why:

a. ☐ because of family relations

b. ☐ because we have developed good business relations

c. ☐ because of contractual relation

d. ☐ other (specify) _____

If no, why?

a. ☐ because I look for the best price

b. ☐ because I don't know anybody I trust

c. ☐ other (specify) _____

7 How much do you pay usually per unit?

a. high supply season: from _____ to _____ TZS per ____ (unit)

b. low supply season: from _____ to _____ TZS per ____ (unit)

8 How much of the product do you buy per …

1. ☐ day 2. ☐ week 3. ☐ month 4. ☐ season

a. high supply season: from _____ to _____ of _____ (unit)

b. low supply season: from _____ to _____ of _____ (unit)

9 Who sets this price? *(read out the answer possibilities)*

1. ☐ me 3. ☐ bargaining process → agreement between both partys

2. ☐ the other party 4. ☐ other (specify) _____

Selling

10 To whom do you mainly sell your products? *(more than one answer possible)*

Where			**who is the most important supplier** (value from 1-3)
1	directly to consumer		
2	vender groups		
3	Broker (wholesale) (doesn't own products)		
4	Intermediary (wholesale)		
5	retailer		
7	road side seller/hawker		
8	Kiosk		
10	small supermarket		
11	large supermarket		
12	large supplier		
13	hotels, hospitals, schools		
14	other (specify):		

11 Do you mainly sell to the same person(s)?

1. ☐ yes 2. ☐ no

If yes, why:

a. ☐ because of family relations

b. ☐ because we have developed good business relations

c. ☐ because of contractual relation

d. ☐ other (specify) _____

If no, why?

a. ☐ because I look for the best price

b. ☐ because I don't know anybody I trust

c. ☐ other (specify) _____

12 How much do you get usually per unit?

a. high supply season: from _____ to _____ TZS per _____ (unit)

b. low supply season: from _____ to _____ TZS per _____ (unit)

13 How much of the product do you sell per …

1. ☐ day 2. ☐ week 3. ☐ month 4. ☐ season

a. high supply season: from _____ to _____ of _____ (unit)

b. low supply season: from _____ to _____ of _____ (unit)

14 Who in your opinion sets the price? *(read out the answer possibilities)*

1. ☐ me 3. ☐ bargaining process → agreement between both partys

2. ☐ the other party 4. ☐ other (specify) _____

ONLY FOR EMPLOYEES

a) How much do you earn as employee

Daily rate (in TZS)		**Working days per month (in TZS)**	
time of high supply	time of low supply	time of high supply	time of low supply
from: to:	from: to:	from: to:	from: to:

Inputs/ Costs

15 What are the necessary inputs/costs (average) to run your business? *(read out answer possibilities)*

Input			Costs in TZS per day/week/month
labour	unpaid workers		
	paid workers (also casual ones)		
Rent of selling location			
Market entrances			
maintenances			
Taxes			
Customs			
road fees			
Transport			
Fuel			
other costs			

16 If you need to, do you have access to an adequate place to store your products? *(read out the answer possibilities)*

1. ☐ yes, and it is enough
2. ☐ yes, but not enough
3. ☐ no, and I don't need
4. ☐ no, but I would need

a. If no, but I would need, why not:

1. ☐ too expensive
2. ☐ no possibility here
3. ☐ other (specify) _____

ONLY FOR CROSS-BORDER TRADE

Who is involved in cross-border trade? (read out answer possibilities)

1. ☐ transport entrepreneur
2. ☐ intermediary
3. ☐ broker
4. ☐ retailer
5. ☐ wholesaler
6. ☐ farmer
7. ☐ large supplier
8. ☐ other (specify) ___

How much of the commodities do you trade from Tanzania to Kenya?

_____ of _____ (unit) per 1.☐day 2.☐ week 3.☐ month 4.☐ season

How much do you have to pay in fees per unit?

from _____ to _____ TZS per _____ (unit)

Are there any circumstances that constrain the cross-border trade?

1. ☐ yes 2. ☐ no

If yes, which ones (more than one answer possible)

	Value
1. ☐ waiting time/procedure at the border	_____
2. ☐ cooperation with clearing agent	_____
3. ☐ price negociation with clearing agent	_____
4. ☐ fees	_____
5. ☐ authority (specify)	_____
6. ☐ other (specify)_____	_____

Among all the answers that you gave, which constrain has the biggest (1)/ second biggest (2) / third biggest (3) importance for you?

What advantage do you have in trading products from Tanzania to Kenya?

1. ☐ higher profit through
   a. ☐ higher prices in Kenya
   b. ☐ higher quality of tanzanian onions or tomatoes

c. ☐ lower taxes and road fees

e. ☐ less regulations and standards in Kenya

f. ☐ higher demand in Kenya

2. ☐ I don't see any special advantages in cross-border trade compared to home market trade

Communication/ Cooperation (inside actor group → traders)

17 Where do you catch up on relevant information on your business? *(more than one answer possible)*

	Value		Value
1. ☐ from family members	_____	7. ☐ from intermediary	_____
2. ☐ from friends	_____	8. ☐ from broker	_____
3. ☐ from fellow traders	_____	9. ☐ from donor NGO	_____
4. ☐ from trader association	_____	10. ☐ own knowledge	_____
5. ☐ from mobile phone	_____	11. ☐ other (specify) _____	
6. ☐ from other media (prints, radio)	_____		

Among all the answers that you gave, which source of information has the biggest (1) / second biggest (2) / third biggest (3) importance for you?

18 Is there any group/cooperation for (tomatoe/onion)-traders?

1. ☐ yes 2. ☐ no

a. If yes, do you participate in this group?

1. ☐ yes 2. ☐ no

Constraints

19 Which circumstances do constrain your trading business of tomatoes/onion? *(more than one answer possible).* Rate from 1-3.

	Value		Value
1. ☐ access to credit	____	8. ☐ set standard	_____
2. ☐ running costs	____	9. ☐ no labour available	_____
3. ☐ lack of storage possibility	_____	10. ☐ authority (specify)	_____

4. ☐ lack of space _____ 11. ☐ failure of payment _____
5. ☐ lack of information _____ 12. ☐ other (specify) _____
6. ☐ access to means of transport_____13. ☐ nothing
7. ☐ repaying of credits _____ 14. ☐ I don’t know

MARKETING

Country: _____ Date: _____ Intw-No.:_____

Intw: _____ Transl.: _____

District: _____ Village/Town: _____ ☐ rural / ☐ urban

Product: ☐ tomatoes / ☐ onions /☐ both

Actors Name: _____ ☐ male / ☐ female Actors location: _____

Position in VC:

☐ production ☐ transport ☐ trade ☐ marketing ☐ consumer ☐ other (specify) _____

Tasks and Functions

1 Are you an entrepreneur, employee or a casual worker?

	Entrepreneur / self-employed			**Employee**		**Informal Sector**
	No. employ-ees	Owns commode-ties	Owns location of selling	Perma-nent	Seaso-nal	Casual
Retail market seller						
Kiosk/stall						
Hawker / roadside seller						

2 Are tomatoes/onions the most important crops for you? *(read out answer possibilities)*

1. ☐ the most important crops 2. ☐ among the most important crops

3. ☐ no important crops

3 Which unit do you use to measure your products and what is the weight in kg of one unit?

a. for buying 1 _____ (crate/bucket/bag/other) = _____ kg

b. for selling 1 _____ (crate/bucket/bag/other) = _____ kg

4 Where do you buy/collect your commodities? *(more than one answer possible)*

where		**in which city or village/ district/ ward**	**what is the most important place** (value from 1-3)
farm gate			
collection place in the village			
local market (near farm)			
wholesale market (in City)			
retail market (in City)			
other (specify):			

5 From whom do you buy/collect your commodities/products? *(more than one answer possible)*

From whom			**who is the most important supplier** (value from 1-3)
1	Farmer		
2	farmer group (specify) _____		
3	Broker (wholesale, doesn't own products)		
4	Intermediary (wholesale)		
5	retailer		
6	Hawker / roadsid seller		
7	Kiosk		
8	Small supermarket		
9	Large supermarket		
10	Large supplier		
11	Other (specify):		

6 Do you mainly buy from the same person(s)?

1. ☐ yes 2. ☐ no

If yes, why:

a. ☐ because of family relations

b. ☐ because we developed good business relations

c. ☐ because of contractual relation

d. ☐ other (specify) _____

If no, why?

a. ☐ because I look for the best price

b. ☐ because I don't know anybody I trust

c. ☐ other (specify) _____

7 How much do you pay usually per unit?

a. high supply season: from _____ to _____ KES per _____ (unit)

b. low supply season: from _____ to _____ KES per _____ (unit)

8 How much of the product do you buy per …

1. ☐ day 2. ☐ week 3. ☐ month 4. ☐ season

a. high supply season: from _____ to _____ of _____ (unit)

b. low supply season: from _____ to _____ of _____ (unit)

9 How many days do you work per week?
_____ days

10 Who sets this price? *(read out the answer possibilities)*

1. ☐ me 3. ☐ it is a bargaining process → agreement of both sides

2. ☐ the other party 4. ☐ other (specify) _____

Selling

11 To whom do you sell your products? *(more than one answer possible)*

To whom			**who is the most important customer** (value from 1-3)
1	directly to consumer		
2	vender groups		
3	Broker (wholesale; doesn't own products)		
4	Intermediary		
5	Retailer		
6	road side seller / hawker		
7	Kiosk		
8	small supermarket		
9	large supermarket		
10	large supplier		
11	hotels, hospitals, schools		
12	other (specify):		

12 Do you mainly sell to the same person(s)?

1. ☐ yes 2. ☐ no

If yes, why?

a. ☐ because of family relations

b. ☐ because we developed good business relations

c. ☐ because of contractual relation

d. ☐ other (specify) _____

If no, why?

a. ☐ because I look for the best price

b. ☐ because I don't know anybody I trust

c. ☐ other (specify) _____

13 How much do you get usually per unit?

a. high supply season: from _____ to _____ KES per _____ (unit)
b. low supply season: from _____ to _____ KES per_____ (unit)

14 How much of the product do you sell per …

1. ☐ day 2. ☐ week 3. ☐ month 4. ☐ season

a. high supply season: from _____ to _____ of _____(unit)
b. low supply season: from _____ to _____ of _____ (unit)

15 Who in your opinion sets the price? *(read out the answer possibilities)*

1. ☐ me
2. ☐ the other party
3. ☐ it is a bargaining process → agreement of both sides
4. ☐ other (specify) _____

ONLY FOR EMPLOYEES

a) How much do you earn as employee

Daily rate		**Working days per month**	
time of high supply	time of low supply	time of high supply	time of low supply
From To	From To	From To	From To

Input/ Costs

16 What are the necessary inputs/costs (average) to run your business? *(read out answer possibilities)*

Input		**Costs in KES per day/week/month**
labour	paid workers (also casual ones)	
	unpaid workers	
Rent of selling location		
market entrances		
maintenances		
taxes		
Road fees		
Fuel		
transport		
other costs		

17 If you need to, do you have access to an adequate place to store your products? *(read out the answer possibilities)*

1. ☐ yes, and it is enough
2. ☐ yes, but not enough
3. ☐ no, and I don't need
4. ☐ no, but I would need

a. If no, but I would need, why not:

1. ☐ too expensive 2. ☐ no possibility here 3. ☐ other (specify) _____

Communication / Cooperation

18 Where do you catch up on relevant information on your business? *(more than one answer possible)*

	Value		Value
1. ☐ from family members	_____	7. ☐ from intermediary	____

2. ☐ from friends _____ 8. ☐ from broker ____

3. ☐ from fellow sellers/traders _____ 9. ☐ donor NGO ____

4. ☐ from trader association _____ 10. ☐ own knowledge ____

5. ☐ from mobile phone _____ 11. ☐ other (specify) ____

6. ☐ from other media (prints, radio) _____

Among all the answers that you gave, which source of information has the biggest (1) / second biggest (2) / third biggest (3) importance for you?

19 Is there any group/cooperation for (tomatoe/onion)-sellers?

1. ☐ yes 2. ☐ no

a. If yes, do you participate

1. ☐ yes 2. ☐ no

Constraints

20 Which circumstances do constrain your selling/trading business of tomatoes/onion? *(more than one answer possible)*

	Value		**Value**
1. ☐ access to credit	___	7. ☐ set standard	___
2. ☐ running costs	___	8. ☐ no labour available	___
3. ☐ lack of storage possibility	___	9. ☐ authority (specify)	___
4. ☐ lack of space	___	10. ☐ failure of payment	___
5. ☐ lack of information	___	11. ☐ other (specify) _____	
6. ☐ access to means of transport	___	12. ☐ nothing	13. ☐ I don't know

Among all the answers that you gave, which constrain has the biggest (1)/ second biggest (2) / third biggest (3) importance for you?

LIVELIHOOD

Country: _____ Date: _____ Intw-No.:_____

Intw: _____ Transl.: _____

District: _____ Village/Town: _____ ☐ rural / ☐ urban

Product: ☐ tomatoes / ☐ onions /☐ both

Actors Name: _____ ☐ male / ☐ female Actors location: _____

Position in VC:

☐ production ☐ transport ☐ trade ☐ marketing ☐ consumer ☐ other (specify)

Personal Information

1. What is your position in the household?
   1. ☐ household head
   2. ☐ spouse
   3. ☐ other (family) relation (specify) _____

For interviewed persons whithout family household, consider the respondant as household head and skip the dwelling questions!

2. What is the gender of the household head?
   1. ☐ male
   2. ☐ female

3. What is the marital status of the household head?
   1. ☐ single
   2. ☐ married (one spouse)
   3. ☐ married (more than one spouse)
   4. ☐ separated
   5. ☐ divorced
   6. ☐ widowed

4. What is the age of the household head (years)?
   1. ☐ 20 or below
   2. ☐ 21-30
   3. ☐ 31-50
   4. ☐ 51 and above

5. How many persons live in your household?

   1. ☐ 4 or less 2. ☐ 5 to 8 3. ☐ more than 9

6. How many children (under 15 years) live in your household?

   1. ☐ 2 or less 2. ☐ 3 to 6 3. ☐ more than 6

7. How many people in the household over 15 years have a:

   1. ☐ regular work _____ (number)
   2. ☐ irregular work _____ (number)
   3. ☐ no work _____ (number)

Education

8. What is the highest level of education the household head has achieved?

   1. ☐ has not completed primary school
   2. ☐ primary school
   3. ☐ secondary school
   4. ☐ first university degree
   5. ☐ second degree and above
   6. ☐ I don't know

9. Is anybody of your household a member of an organisation or association (labour union, church, village council)

   1. ☐ No 2. ☐ Yes

10. Do the children in your household attend school?

    1. ☐ Yes 2. ☐ No 3. ☐ some yes, the others no

    a. If no, because

       1. ☐ too young
       2. ☐ too far away
       3. ☐ too expensive
       4. ☐ they have to work/help in the household/farm
       5. ☐ other constraints (specify) _____

Food Consumption

11. How many times in one week does your household usually eat meat or fish?

    1. ☐ never 2. ☐ 1 to 2 times 3. ☐ 3 – 5 times 4. ☐ every day

12. If you could afford it, would you eat more fish or meat?

1. ☐ Yes 2. ☐ No

Dwelling Information

13. Is the house you live in owned by your family?

1. ☐ yes 2. ☐ no

14. How many rooms does your house have?

1. ☐ 1 2. ☐ 2 to 3 3. ☐ 4 to 5 4. ☐ 6 and above

15. Does your house have …?

a. type of roof:

1. ☐ grass
2. ☐ grass and mud
3. ☐ iron-sheeting
4. ☐ others (specify) _____

b. type of walls

1. ☐ wood
2. ☐ burned/ baked bricks
3 ☐ mud
4. ☐ grass
5. ☐ sun dried bricks
6. ☐ cement
7. ☐ others (specify) __

c. type of flooring:

1. ☐ earth
2. ☐ wood
3. ☐ concrete
4. ☐ ceramics
5. ☐ others (specify)_____

d. electricity supply:

1. ☐ yes, regular 2. ☐ yes, but irregular 3. ☐ no

e. What is the main source of energy for cooking in the household?

1. ☐ fire wood
2. ☐ gas
3. ☐ electricity
4. ☐ fuel/carosin
5. ☐ charcoal
6. ☐ other (specify) _____

16. What kind of water supply for human consumption do you have access to?

1. ☐ water pipe
2. ☐ river
3. ☐ well
4. ☐ rain water
5. ☐ public water pool/ pipe
6. ☐ others (specify) _____

17. Which of these goods does your household posses?

1. ☐ car
2. ☐ motor bike
3. ☐ bike
4. ☐ radio
5. ☐ (mobile) phone
6. ☐ television
7. ☐ sofa
8. ☐ couch
9. ☐ office chairs

18. How long do you have to walk to the nearest public transport stop (from your household)?

1. ☐ less than 10 min
2. ☐ 11 to 30 min
3. ☐ 31 to 60 min
4. ☐ more than 60 min

Income

19. Could you give an estimation of your average daily income?

1. ☐ less than 150 KES
2. ☐ 150 – 500 KES
3. ☐ 501 – 1,000 KES
4. ☐ more than 1,000 KES

Calculation:

a. If yes, in which months?

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Surplus cash												
Enough cash												
Lack of cash												

Why?

Consumption

Country: _____ Date: _____ Intw-No.:_____

Intw: _____ Transl.: _____

District: _____ Village/Town: _____ ☐ rural / ☐ urban

Product: ☐ tomatoes / ☐ onions /☐ both

Actors Name: _____ ☐ male / ☐ female Actors location: _____

Position in VC:

☐ production ☐ transport ☐ trade ☐ marketing ☐ consumer ☐ other (specify) _____

Information on selling/ buying site

1. Where do you mainly buy tomatoes and onions? (more than one answer possible)

	Value		Value
1. ☐ farm	_____	6. ☐ wholesale market	_____
2. ☐ hawker	_____	7. ☐ retail market	_____
3. ☐ road side	_____	8. ☐ small supermarket	_____
4 .☐ kiosk	_____	9. ☐ large supermarket	_____
5. ☐ duka	_____	10. ☐ other (specify)	_____

Please rank importance of buying-place from 1 till 3.

1 = most important, 3 = less important.

2. There are usually several vegetable sellers nearby, why did you choose this particular vendor?

1. ☐ no particular reason, this vendor just happened to be there
2. ☐ this vendor was the closest
3. ☐ quality of vendors products
4. ☐ flavour of the vendors products
5. ☐ cheap prices of vendors products
6. ☐ others (specify) _____

Varieties

3. Which kind of onions do you usually buy?

Size	**Variety**	**Price in KES (range possible)/ unit**	
		Season	**Off-Season**

4. Which kind of tomatoes do you usually buy?

Size	**Variety**	**Price in KES (range possible)/ unit**	
		Season	**/ Off-Season**

5. Which vegetable do you eat and purchase frequently?

	Value		Value
1. ☐ Potatoe	_____	8. ☐ Maize	_____
2. ☐ Sweet potatoe	_____	9. ☐ Cassava	_____
4. ☐ Cooking banana	_____	10. ☐ Onion	_____
5. ☐ Tomatoe	_____	11. ☐ Leaf vegetable	_____
6. ☐ Carrot	_____	12. ☐ Chinese cabbage	_____
7. ☐ Aubergine	_____	13. ☐ Spider plant	_____
		14. ☐ Amaranza	_____

Please rank importance of chosen vegetable from 1 till 3. 1 = most important, 3 = less important.

6. Do you manage to purchase onions/tomatoes in the off-season?

1. ☐ yes 2. ☐ yes, but less than in the season 3. ☐ no

7. What means quality for you? (Read out the answer possibilities)

☐ Size ☐ good colour ☐ not damaged

☐ No pesticide residues ☐ round ☐ good taste

☐ sanity of the stall/market ☐ buying from the producer ☐ organic production

8. What is more important for you, the price or the quality of the vegetable?

1. ☐ Price 2. ☐ Quality

9. Would you buy more tomatoes or onions if they were cheaper?

Tomatoes: 1. ☐ yes 2. ☐ no

Onions: 1. ☐ yes 2. ☐ no

10. Would you buy more tomatoes or onions if they had a better quality?

Tomatoes: 1. ☐ yes 2. ☐ no

Onions: 1. ☐ yes 2. ☐ no

11. Do you know if the products you buy have been treated with pesticides or not?

1. ☐ yes 2. ☐ no

Personal Information

12. What is your age (years)?

1. ☐ 20 or below 3. ☐ 31-50

2. ☐ 21-30 4. ☐ 51 and above

13. What is the highest level of education you attend?

1. ☐ not having finished primary school 4. ☐ first university degree

2. ☐ primary school 5. ☐ second degree and above

3. ☐ secondary school 6. ☐ I don’t know

14. Occupation/ profession:

_____

15. Could you estimate your average daily or monthly income?
What is your monthly income? _____

What is your average daily income?

1. ☐ Less than 150 KES
2. ☐ 150 - 600 KES
3. ☐ 601 – 1000 TZS
4. ☐ More than 1000 TZS

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